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RAILROAD ENGINEMAN TASK AND SKILL STUDY



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16. Abstract <p>This report describes the principal tasks performed by a locomotive engineman during over-the-road freight operations utilizing diesel-electric locomotive equipment. Sixty-four basic tasks are identified and classified into seven task groupings. Each step is described in terms of input to the engineman (rules, signals, display, and other information), information processing and decision making by the engineman, the output of the engineman (control action, communication and the like), feedback of action consequences to the engineman and interactions with other crew members. Each task is also given ratings for difficulty, hazards and criticality for safe operation of the train. The report is intended to provide data in support of further efforts toward relating the engineman's skill requirements (aptitudes, proficiency, training) and working environment to the safety of railroad operations.</p> <p style="text-align: center;">PROPERTY OF R&T LIBRARY</p> <p style="text-align: center;">ASSOCIATION OF AMERICAN RAILROADS TTC TECHNICAL LIBRARY RESEARCH AND TEST DEPARTMENT PUEBLO, CO 81001</p>			
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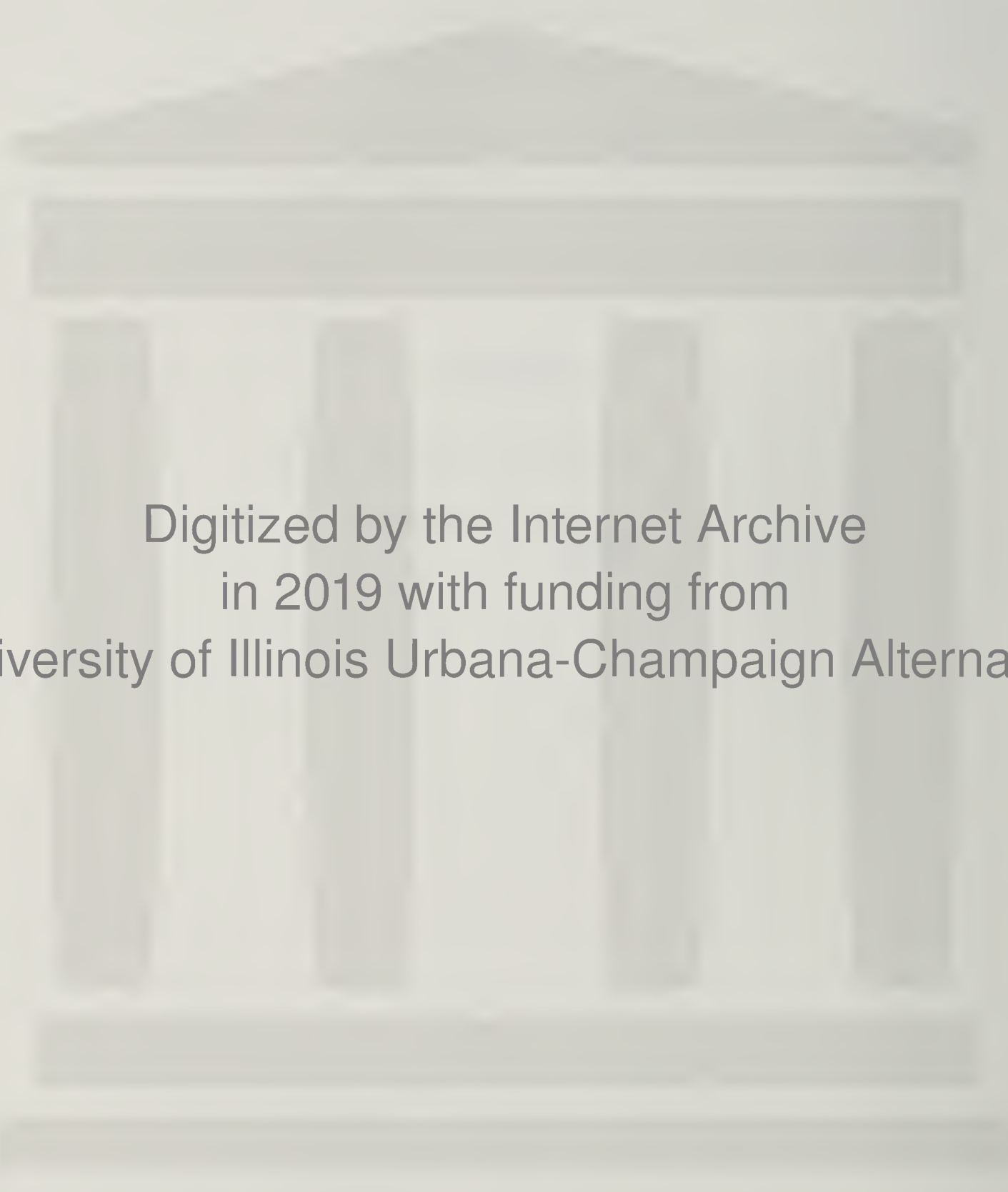
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1. INTRODUCTION

This report describes the principle tasks performed by a locomotive engineman during over-the-road freight operations utilizing diesel-electric locomotive equipment. Detailed task descriptions are presented which depict the task initiating information (stimuli), diagnosis and decision making based on the input stimuli and operating environment, and the response to the decision process which is the physical action or actual task performance. The tasks are also analyzed to determine task difficulty, the potential hazards associated with each task, and the criticality of each task. In addition, the applicability of this particular task data, based on over-the-road freight operations, to other phases of railroad operations involving the engineman is analyzed and presented in summary form.

This report defines the work performed under Contract Number DOT-FR-20036 for the Federal Railroad Administration (FRA) which will provide the FRA with required data to support continued research in the area of improved safety of train operations.

2. TASK ANALYSIS DATA

Our initial activity involving the analysis of engineman tasks by McDonnell Douglas Electronics Company (MDEC) personnel was performed in conjunction with the design and development of the train simulator for Southern Pacific beginning in 1968. Although a detailed task analysis per se was not documented, detailed research concerning the engineman's tasks was performed during the design cycle. The majority of this unwritten data became documented during the performance of a more formalized engineman task analysis for the Vitoria-Minas Railroad, a component of the Cia. Vale Do Rio Doce, located in Brazil (1970). Recent discussions with Southern Pacific and other railroad operating personnel plus observation of enginemen in action have supplemented our existing task data. Review of source data such as operating manuals, handbooks, and railroad rules and regulations has also provided additional data to support the analysis.

The principle tasks of the over-the-road freight engineman are summarized by task grouping in Appendix A. These groupings are:

- A. Basic Handling Tasks
- B. Pre-run Preparation Tasks
- C. Starting Off Tasks
- D. Over-the-road Tasks
- E. Terminating Tasks
- F. Operating Difficulty and Malfunction Tasks
- G. Auxiliary Equipment Operating Tasks

The detailed task descriptions for each of these task groupings are contained in Appendix B. The format for presentation of this data is shown in Figure 1. This format was derived to facilitate examination and evaluation of the task items which describe stimuli, decision making and response. In addition to the man-machine interface (i.e. engineman and train and locomotive equipment), crew

ENGINEER TASK ANALYSIS

TASK NO.	DIFFICULTY
TASK TITLE	HAZARD
SUB-TASK NO.	CRITICALITY
SUB-TASK TITLE	DURATION
	FREQUENCY

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			

FIGURE 1

2. (Continued)

interaction (i.e. engineman with other crew members) or the man-man interface was also considered. The "Comments" column is important in presenting certain cautionary information or other data useful to the engineman during the information processing or decision making cycle of task performance.

Analysis and assessment of task difficulty, potential hazards, and task criticality were performed for each task and are recorded on the data sheets.

Task Difficulty - A quantitative difficulty index was assigned to each task or subtask. A five point scale from least difficult (1) to most difficult (5) was selected. The definitions for the five points on the scale are as follows:

<u>Code</u>	<u>Definition</u>
1	A task that only requires the engineman to recognize devices, determine go/no-go situations, understand non-precision indications, recall limited information, distinguish primary colors, perform menial or simple tasks or perform gross motions to achieve acceptable results.
2	A task that includes requirements to recognize and understand the purpose and principles of operation of devices and systems, make non-precise determinations, recall pertinent information, recognize shades of color, or to perform tasks requiring some planning and manual dexterity to achieve acceptable results.
3	A task that includes requirements to troubleshoot at a gross level, perform non-technical repairs (e.g., change a fuse), or to perform such tasks as checking, inspecting, installing and removing; requires knowledge and skill necessary to detect differences of weights and relative motions, or to perform accurate, coordinated and timely motion to achieve results.

2. (Continued)

Code

Definition

- | | |
|---|---|
| 4 | A task that requires the operation of devices, systems, subsystems, or components, or requires complete system troubleshooting; requires accomplishing detailed procedures, making accurate measurements, or operating devices in an accurate, coordinated and timely manner for desired results. |
| 5 | A task, activity, function, or operation that requires repeated experience in the operation of devices, systems, subsystems, components, and associated equipment; requires extensive recall, understanding, precise knowledge, or correlation, computing, organizing, or controlling hazardous situations or situations affecting the run timetable. May also require making precise, critical and coordinated movements that are necessary for desired results. |

Task Hazards - Rather than using a quantitative scale, hazards are evaluated by generic type. In assessing hazards, it is our opinion that the proper question to ask is:

"Does the performance of the task, per se, expose the
engineman to any set of conditions which could cause
bodily harm?"

This approach is more germane to the problem of task hazards than attempting to assess whether or not improper execution of the task will result in a hazardous situation. The latter is better treated under the classification of task criticality. An alphabetical categorization of task hazards was utilized. A hazard listing is as follows:

- A. Exposure to high voltages (e.g. electric shock or burn)
- B. Exposure of body or appendages to high impact forces (e.g. collisions)
- C. Exposure to excessive accelerations and decelerations
- D. Exposure to excessive acoustical noise

2. (Continued)
 - E. Exposure to falling objects (e.g. derailment)
 - F. Slippery or dangerous footing
 - G. Impaired visibility
 - H. Exposure to fire or explosion
 - No Hazard Involved

Task Criticality - A quantitative criticality rating was assigned to each task or subtask. A five point scale is utilized, from least critical (1) to most critical (5). Criticality is assessed within the context of impact upon successful completion of the assigned run. The definitions of the five points on the criticality scale are as follows:

<u>Code</u>	<u>Definition</u>
1	Failure to perform task or improper performance will not impact the successful completion of the run or expose either equipment or personnel to a hazardous situation.
2	Failure to perform or improper performance may cause run completion to be behind schedule but not so as to result in damaged cargo or may result in a situation which is in itself not potentially hazardous but which if improperly handled will lead to a hazardous situation (i.e., "ripple through" effect).
3	Failure to perform or improper performance will result in minor damage to railway equipment (i.e., repairable in field) or will place the train in a situation requiring precise and rapid corrective action in order to prevent major damage.
4	Failure to perform or improper performance will result in major equipment damage requiring repair at central shop facilities or will result in significant cargo damage (e.g., loss of a percentage of the load) or in minor injuries to operating personnel.

2. (Continued)

Code

Definition

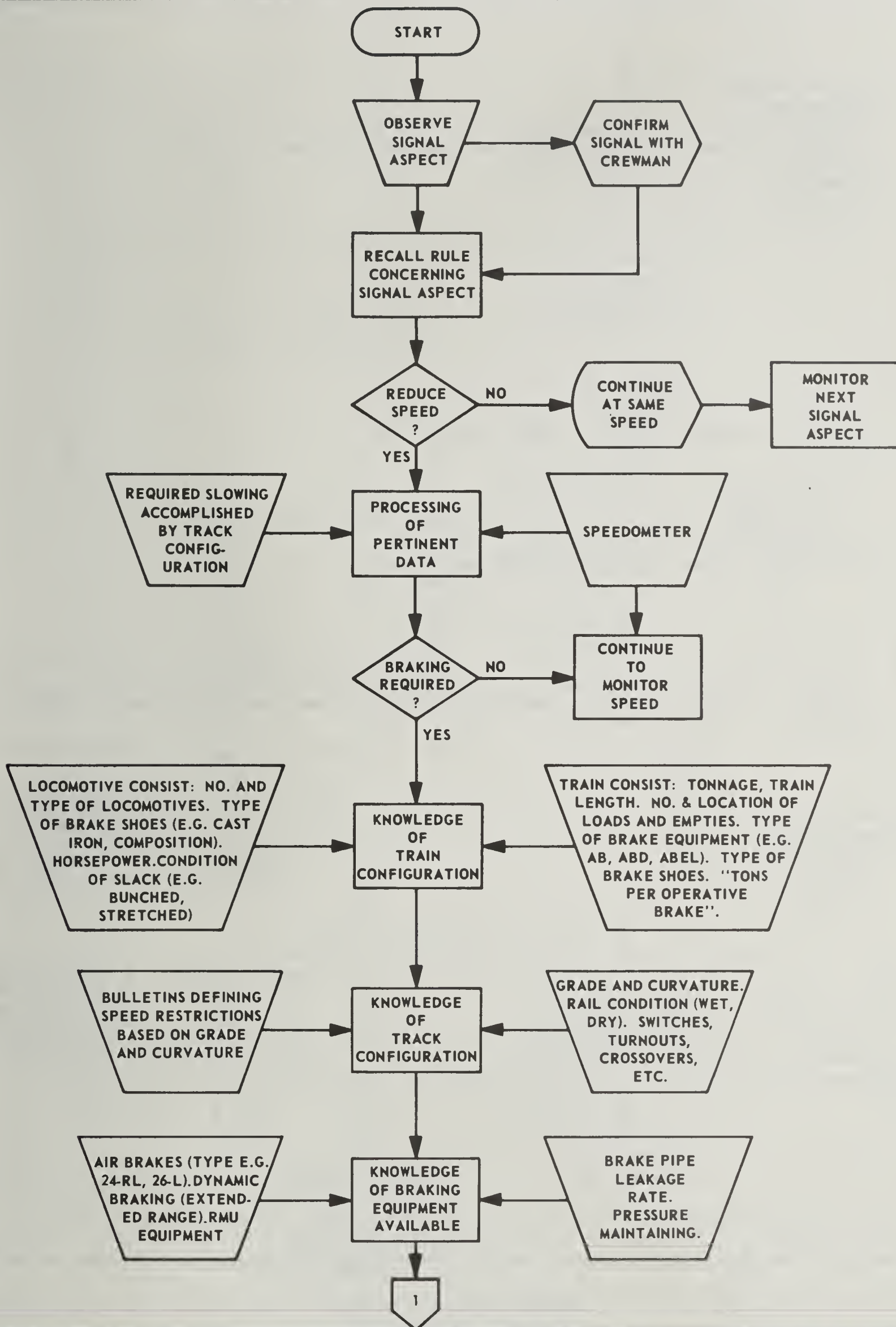
5	Failure to perform or improper performance will result in a catastrophic situation involving major equipment damage, major cargo loss or damage, major injuries or death or significant disruption or destruction of bystanding personnel or property.
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3. DECISION FLOW CHART

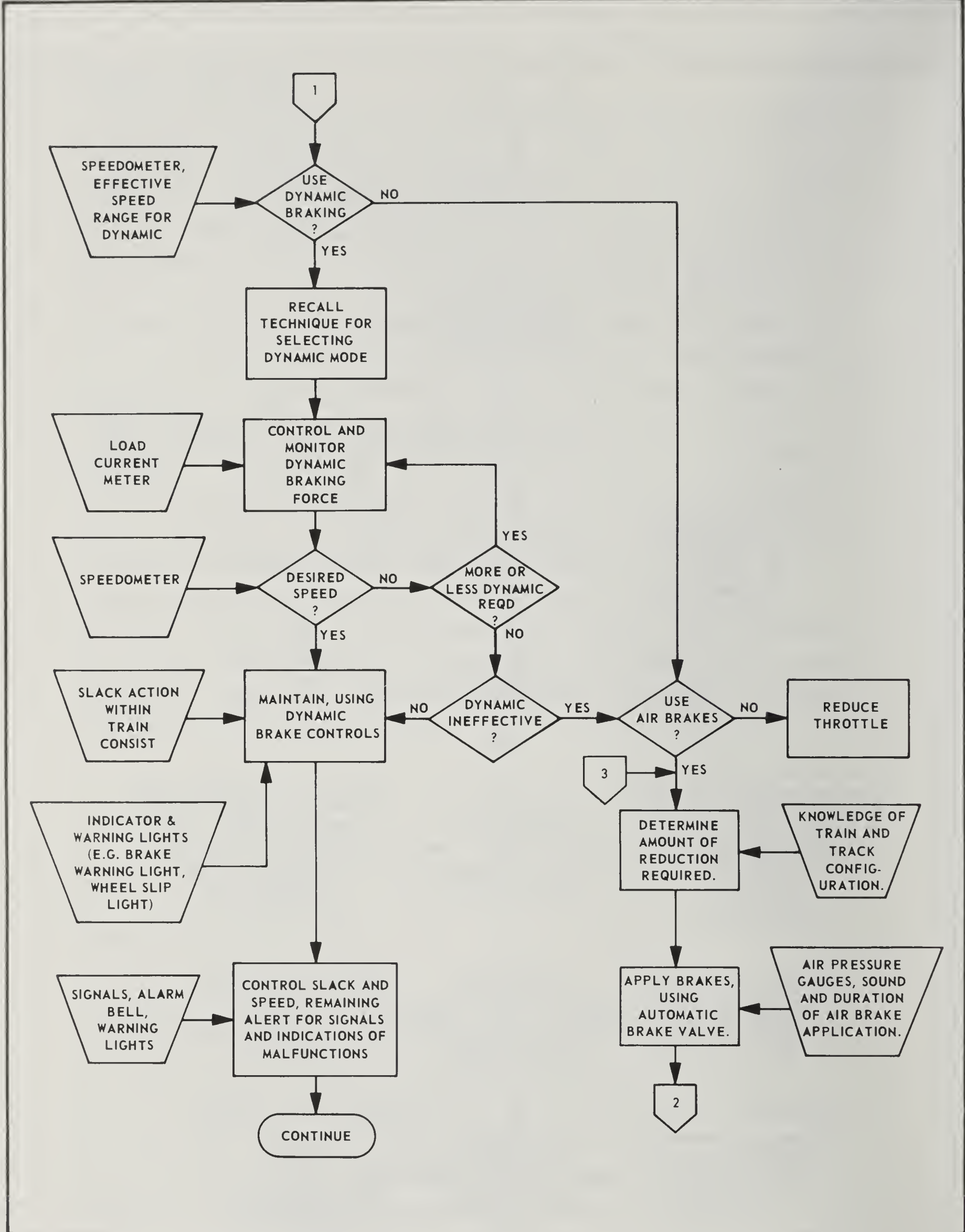
A technique for expressing the decision making process in graphic form is the preparation of a decision flow chart. This method depicts the input information required prior to making each decision. Then the output response based on the decision made is indicated. As an example of how the task analysis data could be formatted in a different matter to facilitate further analysis, a decision flow chart of one of the engineman's tasks is used. The task selected was one which involved braking the train. Incidentally, this is one of the most difficult, critical and complex tasks that an engineman performs. Like most complex tasks, it is composed of a group of basically simple sub-tasks; but due to the time required to perform, the interaction among the tasks, and the mental processing required prior to the physical response, the task becomes exceedingly complex to perform. Figure 2 indicates the sample decision flow chart for the train braking task which is involved in performance of speed and slack control. The complexity and interaction of this task is indicated by the many loops or feedback paths shown in the figure. Also, notice the number of decision and information processing blocks.

It should be pointed out that this sample flow chart describes a normal or typical braking activity initiated by observance of a signal light. To prevent this example from becoming more complex, the occurrence of abnormal events (e.g., decision to use emergency brakes) was not included.

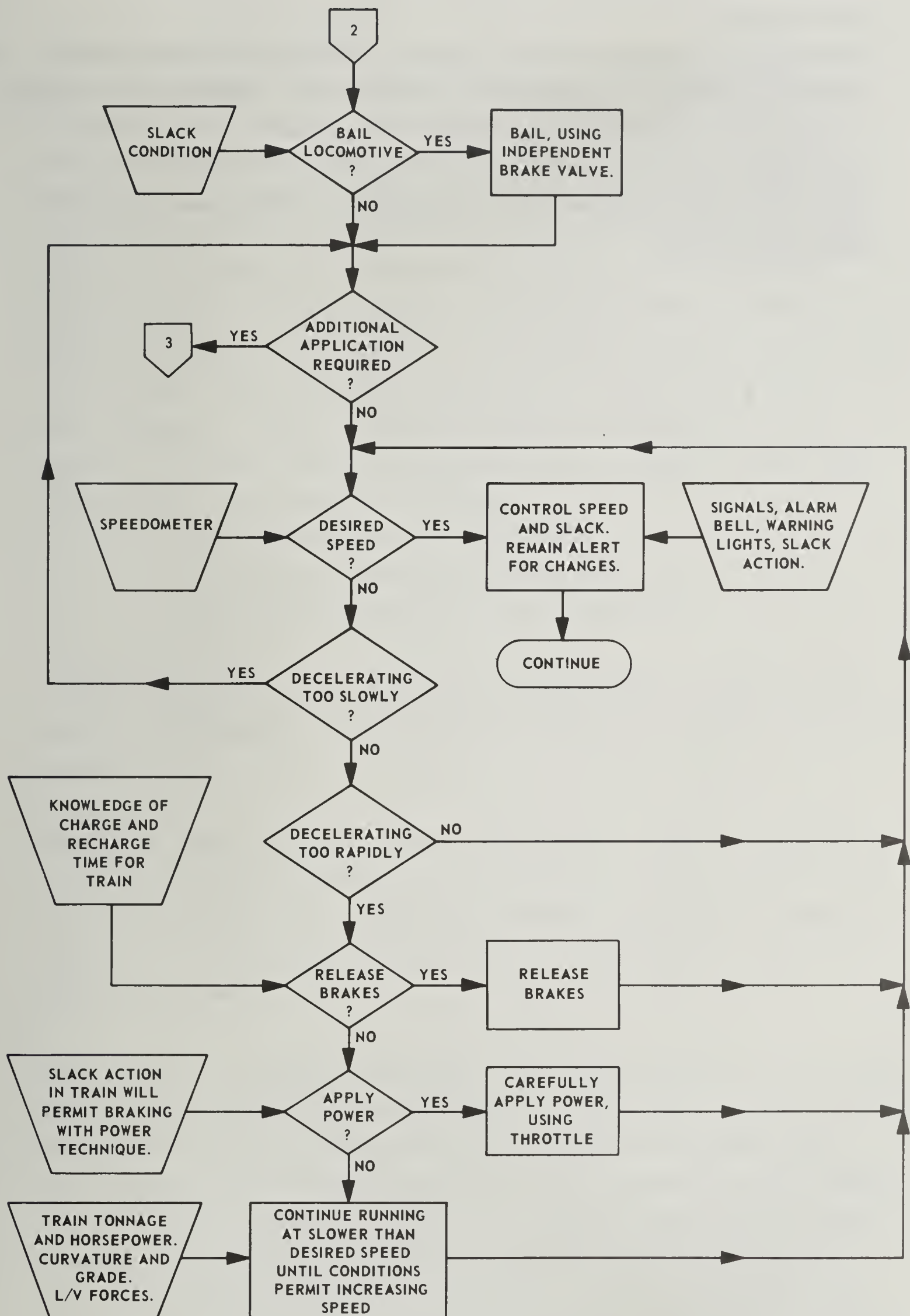
As mentioned before, the actual physical response of moving the brake controls is very simple; however, movement of these controls to control slack properly is a difficult task, requiring the mental processing of an abundance of input data, which, incidentally, is continuously varying. This is the reason that the end terminal of the flow chart is labeled CONTINUE, since the task of train braking is a continuous task during train operations.



TRAIN BRAKING PROCESS
(SAMPLE FLOW CHART)
FIGURE 2



TRAIN BRAKING PROCESS
(SAMPLE FLOW CHART)
FIGURE 2 (CONTINUED)



TRAIN BRAKING PROCESS
(SAMPLE FLOW CHART)
FIGURE 2 (CONTINUED)

3. (Continued)

Preparation of decision charts similar to this one for the other principle engineman tasks should greatly assist the FRA in evaluation of the safety of railroad operations. For example, these charts could depict what incorrect decision might occur if insufficient input data were available to the engineman, thereby resulting in unsafe operations.

4. TASK DATA SUMMARY MATRICES

As enumerated many times within this report, this task analysis basically describes the principle operational tasks of the over-the-road freight engineman operating diesel-electric locomotive equipment. Although this category defines a large percentage of the environment in which most enginemen function, there are other important categories not directly considered by this analysis. However, some of these engineman tasks are applicable to the different operating environments. To indicate the applicability of these tasks, task data summary matrices for each task grouping were prepared. These are shown in Figures 3 through 9. In an effort to indicate degree of applicability, a simple rating scale was devised. The scale is as follows:

- 2 - indicates totally applicable
- 1 - indicates partially applicable
- 0 - indicates little or no applicability

In addition, an "X" under the column labeled SAFETY indicates that improper performance of that task may lead to a potentially hazardous situation.

Review of these matrices reveals that the task data is specifically relevant to freight operation using diesel-electric equipment. A large percentage of the tasks are partially applicable to passenger operation. A much smaller percentage are applicable to yard and hump operations.

With regard to locomotive equipment, the task analysis is basically written for enginemen operating either E.M.D. SD-45 (Southern Pacific) or DDM-45 (C.V.R.D.) diesel-electric locomotives equipped with Westinghouse 26-L air brake equipment. For different models and/or types of diesel-electric locomotives, specific controls will vary. However, the information processing and decision making cycle of the task performance will be very similar, if not identical. For this reason, most of these tasks are partially applicable to diesel-hydraulic locomotives, with a smaller percentage applicable to

4. (Continued)

electric locomotives.

As evidenced by the matrices, a large percentage of the tasks are applicable over a wide range of external environmental conditions. Although this list is not all encompassing, it does indicate the influence of external factors (e.g., weather conditions) on task performance.

Concerning safety of operations, these matrices reveal that approximately 65% of the tasks, if improperly performed, may lead to potentially hazardous situations. This emphasizes the need for training for proper job performance to reduce or eliminate unsafe operations. Proper training exhibits safe task performance as a primary goal or objective.

[illegible]

TASK DATA SUMMARY MATRIX
TASK GROUPING B
PRE-RUN PREPARATION TASKS
FIGURE 4

[illegible]

TASK DATA SUMMARY MATRIX
TASK GROUPING C
STARTING OFF TASKS
FIGURE 5

TASK DESCRIPTION		FREIGHT	PASSENGER	YARD	HUMP		DIESEL ELECTRIC	DIESEL HYDRAULIC	ELECTRIC		HIGH GRADE (MOUNT.)	LOW GRADE (FLAT)	UNLIMITED VISIBILITY	RESTRICTED VISIBILITY	DRY CONDITION	WET CONDITION		SAFETY
NO.	TITLE																	
C.1	Obtaining Clearance to Proceed	2	1	0	0		2	1	1									
C.2	Starting the Train																	
C.2.1	Initial Control Positions	2	1	1	1		2	1	0		2	2	2	2	2	2		
C.2.2	Releasing Air Brakes	2	1	1	1		2	1	1		1	2	2	2	2	1		X
C.2.3	Start Movement	2	0	0	0		2	1	0		1	2	2	2	2	1		X
C.2.4	Observation of Load Current	2	1	1	1		2	1	1		2	2	2	2	2	2		
C.2.5	Train Velocity Determination at Slow Speeds	2	1	1	1		2	1	1		1	2	2	2	2	1		
C.2.6	Confirmation of Caboose Movement	2	0	0	0		2	1	1		2	2	2	2	2	2		
C.2.7	Operation of Auxiliary Equipment	2	0	0	0		2	0	0									
C.2.8	Under Special Situations (a) Descending Grade	2	0	0	0		2	1	1		2	1	2	2	2	1		X
C.2.9	Under Special Situations (b) Ascending Grade	2	0	0	0		2	1	1		2	1	2	2	2	1		X
C.3	Moving to Main Track	2	1	0	0		2	1	1		1	2	2	1	2	2		X

TASK DATA SUMMARY MATRIX
TASK GROUPING D
OVER-THE-ROAD TASKS
FIGURE 6

TASK DESCRIPTION		FREIGHT	PASSENGER	YARD	HUMP		DIESEL ELECTRIC	DIESEL HYDRAULIC	ELECTRIC		HIGH GRADE (MOUNT.)	LOW GRADE (FLAT)	UNLIMITED VISIBILITY	RESTRICTED VISIBILITY	DRY CONDITION	WET CONDITION		SAFETY
NO.	TITLE																	
D.1	Speed and Slack Cntrl.																	
D.1.1	Knowledge of Train Consist and Territory	2	1	0	0		2	2	2		2	2	2	2	2	2		
D.1.2	Automatic Braking	2	0	0	0		2	1	1		1	2	2	2	2	1		X
D.1.3	Dynamic Brake Mode	2	0	0	0		2	1	0		2	1	2	2	2	2		
D.1.4	Power Reapplication	2	0	0	0		2	1	0		2	1	2	2	2	1		X
D.1.5	Maintain Schedule	2	0	0	0		2	1	1		1	2	2	1	2	1		X
D.1.6	Response to Signal Aspects	2	1	0	0		2	1	1		2	2	2	1	2	2		
D.1.7	Undulating Territory Operation	2	1	0	0		2	1	1		2	1	2	2	2	2		X
D.2	Maintenance Requirements	2	0	0	0		2	0	0									
D.3	Approaching Crossings	2	1	0	0		2	1	1		2	2	2	1	2	2		X
D.4	Entering and Leaving Sidings	2	1	0	0		2	1	1		2	2	2	2	2	2		X
D.5	Negotiating Turnouts and Crossovers	2	1	1	1		2	1	1		2	2	2	2	2	2		X
D.6	Passing Equipment Adjacent to Tracks	2	1	1	1		2	1	1		2	2	2	1	2	2		X
D.7	Passing Train on Adjacent Track	2	1	0	0		2	1	1		2	2	2	1	2	2		X
D.8	Receiving Wayside Messages	2	1	0	0		2	1	1		2	2	2	1	2	2		

TASK DATA SUMMARY MATRIX
TASK GROUPING E
TERMINATING TASKS
FIGURE 7

TASK DESCRIPTION		FREIGHT	PASSENGER	YARD	HUMP		DIESEL ELECTRIC	DIESEL HYDRAULIC	ELECTRIC		HIGH GRADE (MOUNT.)	LOW GRADE (FLAT)	UNLIMITED VISIBILITY	RESTRICTED VISIBILITY	DRY CONDITION	WET CONDITION		SAFETY
NO.	TITLE																	
E.1	Leaving the Main Track	2	2	0	0		2	2	1		1	2	2	1	2	1		X
E.2	Stopping the Train																	
E.2.1	Braking with Power Off	2	0	0	0		2	1	1		1	2	2	1	2	1		X
E.2.2	Dynamic Braking	2	0	0	0		2	2	1		2	0	2	2	2	1		X
E.2.3	Air Brake Application	2	0	0	0		2	2	2		2	2	2	2	2	2		
E.2.4	Braking with Power Applied	2	0	0	0		2	1	1		1	2	2	1	2	1		X
E.2.5	Maintaining Stretched Configuration	2	0	0	0		2	1	0		0	2	2	1	2	1		X
E.2.6	Avoiding Excessive Coupler Force	2	0	0	0		2	1	0		1	2	2	2	2	1		X
E.2.7	Low Velocity Control	2	0	0	0		2	2	1		0	2	2	2	2	1		X
E.2.8	Final Reduction	2	1	1	1		2	2	2		1	2	2	2	2	1		
E.2.9	Stop on Receiving Track	2	0	0	0		2	2	1		0	2	2	1	2	1		
E.3	Detach and Store Locomotive(s)																	
E.3.1	Detach Locomotive	2	1	0	0		2	1	1		0	2	2	1	2	1		
E.3.2	Store Locomotive	2	1	0	0		2	1	1		0	2	2	1	2	2		X
E.4	Complete Paperwork	2	1	1	1		2	1	1									

TASK DATA SUMMARY MATRIX
TASK GROUPING F
OPERATING DIFFICULTY AND
MALFUNCTION TASKS
FIGURE 8

TASK DESCRIPTION		FREIGHT	PASSENGER	YARD	HUMP		DIESEL ELECTRIC	DIESEL HYDRAULIC	ELECTRIC		HIGH GRADE (MOUNT.)	LOW GRADE (FLAT)	UNLIMITED VISIBILITY	RESTRICTED VISIBILITY	DRY CONDITION	WET CONDITION		SAFETY
NO.	TITLE																	
F.1	Responding to Obstructions	2	1	1	1		2	1	1		1	2	2	1	2	1		X
F.2	Responding to Torpedoes and Fusees	2	1	0	0		2	1	1		2	2	2	2	2	2		X
F.3	Responding to Temporary Restrictions and Slow Boards	2	1	1	1		2	1	1		2	2	2	1	2	2		X
F.4	Responding to Improper Signals	2	1	1	0		2	1	1		2	2	2	1	2	2		X
F.5	Responding to Degraded Dynamic Braking	2	1	0	0		2	1	1		2	0	2	2	2	1		X
F.6	Responding to Degraded Traction Motor Operation	2	1	1	1		2	1	0		2	2	2	2	2	2		X
F.7	Responding to Diesel Engine Defects	2	1	1	1		2	1	0		2	2	2	2	2	2		X
F.8	Responding to No Throttle Response	2	1	1	1		2	1	1		1	2	2	1	2	2		X
F.9	Responding to Engine Shutdown	2	1	1	1		2	1	0		1	2	2	1	2	2		X
F.10	Responding to Loss of Sand	2	1	1	1		2	1	1		1	2	2	2	1	2		X
F.11	Responding to Battery Discharge	2	1	1	1		2	1	0		2	2	2	2	2	2		X
F.12	Responding to Alarm Bell	2	1	0	0		2	1	1		2	2	2	2	2	2		X
F.12.1	Cause: Hot Engine	2	1	1	1		2	1	0		2	2	2	2	2	2		X
F.12.2	Cause: No Power	2	1	1	1		2	1	0		1	2	2	2	2	1		
F.12.3	Cause: Low Oil-Water-Pressure	2	1	1	1		2	1	0		1	2	2	2	2	1		X
F.12.4	Cause: Engine Shutdown	2	1	1	1		2	1	0		1	2	2	2	2	1		
F.12.5	Cause: High Voltage Ground	2	1	1	1		2	1	1		2	2	2	2	2	2		X
F.12.6	Cause: Excitation Lmt.	2	1	1	1		2	1	1		2	2	2	2	2	2		
F.13	Responding to Locomotive Overspeed	2	1	0	0		2	1	1		1	2	2	1	2	1		X
F.14	Responding to Brake Warning	2	1	1	0		2	1	1		1	2	2	2	2	1		
F.15	Responding to Wheel Slip	2	1	1	1		2	1	1		1	2	2	2	2	1		X
F.16	Responding to Open PCS	2	1	1	1		2	1	1		2	2	2	2	2	2		X
F.17	Responding to Automatic Train Control Warning	2	1	0	0		2	1	1		1	2	2	1	2	1		X
F.18	Responding to Safety Control Devices	2	1	1	0		2	1	1		2	2	2	2	2	2		X
F.19	Responding to Emergency Braking	2	1	1	0		2	1	1		2	2	2	2	2	2		X

PAGE TWO	
TASK DATA SUMMARY MATRIX	
TASK GROUPING F	
OPERATING DIFFICULTY AND	
MALFUNCTION TASKS	
FIGURE 8	
(CONTINUED)	
IGHT	
SENGER	
D	
P	
SEL ELECTRIC	
SEL HYDRAULIC	
CTRIC	
H GRADE (MOUNT.)	
GRADE (FLAT)	
IMITED VISIBILITY	
TRICTED VISIBILITY	
CONDITION	
CONDITION	
ETY	

[illegible]

TASK DATA SUMMARY MATRIX	
TASK GROUPING G	
AUXILIARY EQUIPMENT	
OPERATING TASKS	
FIGURE 9	
IGHT	
SENGER	
D	
P	
SEL ELECTRIC	
SEL HYDRAULIC	
CTRIC	
H GRADE (MOUNT.)	
GRADE (FLAT)	
LIMITED VISIBILITY	
TRICTED VISIBILITY	
CONDITION	
CONDITION	
ETY	

[illegible]

5. CONCLUSIONS AND RECOMMENDATIONS

This task analysis which defines the principle tasks of the over-the-road freight engineman is prepared with the intent of assisting the FRA in attaining their goal of improved safety in railroad operations. Detailed analysis of what a man does during performance of his job is an essential step in uncovering areas which may contribute to unsafe operations.

The input data which initiates the task and the processing of this information to decide what task should be performed are equally important as the physical response or actual task performance. An example of how the tasks may be further analyzed is shown in Figure 2, the decision flow chart. It is recommended that the FRA utilize a similar technique for further analysis of the more complex engineman tasks.

The majority of engineman activities relate to over-the-road freight operations. However, as the task data summary matrices point out, additional engineman tasks relative to other phases of railroad operations (e.g., yard and terminal activities) are not defined by this analysis. Therefore, it is recommended that engineman tasks performed in other operations, on different types of equipment and under variations of external environmental conditions be examined.

Beginning an examination of the engineman's job is a logical starting point for evaluation of safety in railroad operations. However, railroad operations are complex in nature, involving interactions among the engineman and the train crew, yard personnel and other operating personnel. Therefore, detailed task analysis for all aspects of safety of railroad activities are needed.

The goal which the FRA has established of improved safety in operation of American railroads is a commendable one. Based on our expertise in both task analyses and railroad operations, MDEC would be pleased to offer our assistance and cooperation in future undertakings that the FRA deems necessary to attain your goal of improved railway safety.

APPENDIX A

PRINCIPLE ENGINEMAN TASKS

Task Grouping A

Basic Handling Tasks

1. Accelerating
2. Decelerating
3. Automatic Braking
4. Independent Braking
5. Braking with Power
6. Dynamic Braking
7. Backing Up
8. Sanding

Task Grouping B

Pre-Run Preparation Tasks

1. Registering
2. Pre-Trip Inspection
3. Starting Engine
4. Post-Start Inspection
5. Preparation and Initial
Movement of Locomotive
6. Forming the Consist

Task Grouping C

Starting Off Tasks

1. Obtaining Clearance to Proceed
2. Starting the Train
3. Moving to Main Track

Task Grouping D

Over-the-Road Tasks

1. Speed and Slack Control
2. Maintenance Requirements
3. Approaching Crossings
4. Entering and Leaving Sidings
5. Negotiating Turnouts
and Crossovers
6. Passing Equipment Adjacent to Tracks
7. Passing Train Adjacent to Track
8. Receiving Wayside Messages

Task Grouping E

Terminating Tasks

1. Leaving the Main Track
2. Stopping the Train
3. Detach and Store Locomotive
4. Complete Paperwork

Task Grouping F

Operating Difficulty and Malfunction Tasks

1. Responding to Obstructions on Tracks
2. Responding to Torpedoes and Fuses
3. Responding to Temporary Restrictions and
Slow Boards
4. Responding to Improper Signals
5. Responding to Degraded Dynamic Braking
6. Responding to Degraded Traction Motor
Operation

Task Grouping F (Continued)

Operating Difficulty and Malfunction Tasks

7. Responding to Diesel Engine Defects
8. Responding to No Throttle Response
9. Responding to Engine Shutdown
10. Responding to Loss of Sand
11. Responding to Battery Discharge
12. Responding to Alarm Bell
13. Responding to Locomotive Overspeed
14. Responding to Brake Warning
15. Responding to Wheel Slip
16. Responding to Open PCS
17. Responding to Automatic Train Control Warning
18. Responding to Safety Control Devices
19. Responding to Emergency Braking
20. Correcting Derail Condition
21. Replacing Broken Knuckle
22. Setting Out Damaged Cars
23. Responding to Known Locomotive Defects
24. Responding to Natural Hazards
25. Responding to Hot Journal Bearings

Task Grouping G

Auxiliary Equipment Operating Tasks

1. Operation of Air Horn
2. Operation of Train Bell
3. Operation of Radio/Telephone
4. Use of Windshield Wipers and/or Defogger
5. Use of Locomotive Cab Heater
6. Use of Light Controls
7. Use of Attendant Call Button
8. Use of Fire Extinguisher
9. Use of RMU Equipment
10. Use of Retainers

APPENDIX B

ENGINEMAN TASK ANALYSIS DATA SHEETS

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 2

TASK NO.	A.1	DIFFICULTY	4
TASK TITLE	ACCELERATING	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	3
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ADVANCE THROTTLE FROM ONE RUN POSITION TO THE NEXT HIGHER RUN NUMBER OR NOTCH.	INDICATION THAT SPEED INCREASE IS PERMITTED AND/OR REQUIRED. KNOWLEDGE OF WHERE SLACK IS IN THE TRAIN	SPEED LIMIT SIGNS, SIGNALING DEVICES (e.g. LIGHTS, FLAGS), TRAIN ORDERS	THOROUGH UNDERSTANDING OF RULES CONCERNING SPEED LIMITS. EFFECTS OF SLACK ACTION DURING ACCELERATING OPERATIONS RECALL PHYSICAL SENSATIONS OF MOTION WHICH INDICATE PROPER CONTROL OF SLACK ACTION (i.e. DOES IT "FEEL" RIGHT?)	MOVE THROTTLE HANDLE TO THE NEXT NOTCH.	THROTTLE AND ASSOCIATED THROTTLE POSITION INDICATOR WINDOW, SPEEDOMETER.	OBSERVE NUMBER FOR THROTTLE POSITION IN WINDOW. NATURALLY OBSERVE INCREASE IN POWER. OBSERVE INCREASE IN TRAIN SPEED ON SPEEDOMETER		THIS TECHNIQUE PERMITS MAXIMUM ACCELERATION WITHOUT SLIPPING THE WHEELS AND CAUSING EXCESSIVE SLACK ACTION.
2.	MONITOR LOAD CURRENT METER, CONTINUING TO ADVANCE THROTTLE UNTIL DESIRED SPEED IS OBTAINED.	LOAD CURRENT.	LOAD CURRENT METER.	KNOWLEDGE THAT LOAD CURRENT METER PROVIDES INDICATION OF APPLIED POWER. KNOWLEDGE THAT ADDITIONAL TRAIN ACCELERATION IS OBTAINED AUTOMATICALLY BY TRANSITIONING (SWITCHING OF TRACTION MOTORS FROM SERIES TO PARALLEL OPERATIONS) DURING CERTAIN THROTTLE CHANGES. NOTE THAT IF LOCOMOTIVE DOES NOT HAVE AUTOMATIC TRANSITION, MANUAL OPERATION OF THE SELECTOR LEVER IS REQUIRED.	OBSERVE LOAD CURRENT METER AND OPERATE THROTTLE ACCORDINGLY, ONE NOTCH AT A TIME	THROTTLE, LOAD CURRENT METER, SPEEDOMETER.	OBSERVE METER. FOR THROTTLE ADVANCE, CURRENT INCREASES WHEN CURRENT STOPS INCREASING OR BEGINS DECREASING. ADVANCE THROTTLE ANOTHER NOTCH UNTIL DESIRED SPEED IS REACHED.		EXCEEDING CURRENT LIMITS COULD DAMAGE TRACTION MOTORS

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 2

TASK NO.	A.1	DIFFICULTY	4
TASK TITLE	ACCELERATING	HAZARD	
SUB-TASK NO.		CRITICALITY	3
SUB-TASK TITLE		DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
3.	MONITOR WHEEL SLIP INDICATOR LIGHT.	WHEELS SLIPPING	WHEEL SLIP INDICATOR	ARE WHEELS SLIPPING? SANDING MAY BE REQUIRED TO IMPROVE TRACTION	REDUCE THROTTLE SETTING UNTIL SLIPPING CEASES.	THROTTLE, WHEEL SLIP LIGHT.	WHEELS STOP SLIPPING AND WHEEL SLIP LIGHT GOES OUT		MOST UNITS ARE EQUIPPED FOR AUTOMATIC SANDING DURING WHEEL SLIP

ENGINEMAN TASK ANALYSIS

TASK NO.	A 2	DIFFICULTY	4
TASK TITLE	DECELERATING	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	3
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RETARD THROTTLE FROM ONE OF THE NUMBERED 'RUN' POSITIONS TO THE NEXT LOWER NUMBER	DECREASE IN TRAIN SPEED PERMITTED AND/OR REQUIRED. LOCATION OF SLACK WITHIN THE TRAIN	SPEED LIMIT INDICATING DEVICES (SIGNAL LIGHTS, SPEED BOARDS, FLAGS, TRAIN ORDERS, ETC). SPEEDOMETER	BASED ON PHYSICAL FEELING OF MOTION WHICH DEPICTS TRAIN SLACK ACTION, DETERMINE PROPER HANDLING TECHNIQUE FOR REDUCING TRAIN SPEED	RETARD THROTTLE HANDLE.	THROTTLE AND ASSOCIATED THROTTLE POSITION INDICATOR WINDOW, SPEEDOMETER	OBSERVE DECREASE IN THROTTLE POSITION NUMBER IN WINDOW OBSERVE TRAIN SPEED DECREASE ON SPEEDOMETER. AURALLY OBSERVE POWER DECREASE		THROTTLE MUST BE RETARDED GRADUALLY TO PREVENT EXCESSIVE SLACK ACTION AND SHOCKS
2	CONTINUE NOTCHING THE THROTTLE SLOWLY DOWNWARD UNTIL DESIRED SPEED IS OBTAINED	TRAIN SPEED APPROACHING DESIRED VALUE	SPEEDOMETER	TRAIN SPEED CONTINUES TO SLOWLY DECREASE	RETARD THROTTLE HANDLE.	THROTTLE AND ASSOCIATED THROTTLE POSITION INDICATOR WINDOW, SPEEDOMETER.			NORMALLY, DECELERATION IS ACCOMPLISHED MORE BY BRAKING TECHNIQUES INSTEAD OF REDUCING THROTTLE

ENGINEERMAN TASK ANALYSIS

SHEET 1 OF 2

TASK NO.	A. 3	DIFFICULTY	4
TASK TITLE	AUTOMATIC BRAKING	HAZARD	B, C, E
SUB-TASK NO.	-	CRITICALITY	5*
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1	USE OF AUTOMATIC (TRAIN) BRAKES TO CONTROL THE SPEED OR STOP THE TRAIN.	TRAIN SPEED TRAIN CONSIST NUMBER AND LOCATION OF FULLS AND EMPTIES. TONNAGE. LOCOMOTIVE CONSIST TYPE OF UNIT, BRAKE SHOES (e.g. COMPOSITION OR CAST IRON) LOCATION OF SLACK WITHIN TRAIN. TRACK CONFIGURATION (e.g. GRADE, CURVATURE). WEATHER CONDITIONS.	SPEEDOMETER	BASED ON INDICATED INPUT INFORMATION, DETERMINE THE PROPER TECHNIQUE FOR APPLICATION OF AUTOMATIC BRAKES TO (1) CONTROL AND/OR REDUCE TRAIN SPEED. (2) STOP THE TRAIN. THOROUGH KNOWLEDGE OF BRAKE SYSTEM OPERATION IS REQUIRED	PLACE BRAKE HANDLE TO DESIRED POSITION. THE OPERATING POSITIONS ARE (1) RELEASE (2) MINIMUM REDUCTION (3) SERVICE APPLICATION (4) SUPPRESSION (5) HANDLE - OFF (6) EMERGENCY	AUTOMATIC BRAKE HANDLE.	OBSERVE TRAIN SPEED REDUCTION ON SPEEDOMETER. AURALLY OBSERVE PRESSURE RELEASE AND NOTICE THE BRAKE FLOW METER MOVEMENT. OBSERVE REDUCTION IN BRAKE PIPE PRESSURE GAUGE READING	KNOWLEDGE CONCERNING TRAIN MAKE UP IS OBTAINED FROM AND/OR COMMUNICATED TO ALL CREW MEMBERS.	*THE FIRST AIR BRAKE APPLICATION OF THE RUN IS ONE OF THE MOST CRITICAL TASK THAT AN ENGINEERMAN PERFORMS! BRAKING MUST BE PROPERLY APPLIED TO PREVENT EXCESSIVE SLACK ACTION OR SHOCKS CARE MUST BE EXERCISED SUCH THAT THE BRAKE PIPE PRESSURE IS NOT COMPLETELY DEPLETED PRIOR TO REACHING A FULL STOP

ENGINEER TASK ANALYSIS

SHEET 2 OF 2

TASK NO.	A.3	DIFFICULTY	4
TASK TITLE	AUTOMATIC BRAKING	HAZARD	B, C, E
SUB-TASK NO.	-	CRITICALITY	5*
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
2	PREVENT AUTOMATIC BRAKING FROM CAUSING BRAKE APPLICATION ON LOCOMOTIVE(S).			TO MAINTAIN TRAIN CONFIGURATION (e.g. STRETCHED), DO NOT BRAKE THE LOCOMOTIVES WHILE BRAKING THE CARS. KNOWLEDGE OF INDEPENDENT BRAKE HANDLE OPERATION.	WITH THE INDEPENDENT BRAKE HANDLE IN THE 'RELEASE' POSITION, DEPRESS ("BAIL") THE BRAKE HANDLE.	INDEPENDENT BRAKE HANDLE.	AURAL SOUND OF BAILING.		USED IN SPECIAL CIRCUMSTANCES TO AVOID SLACK RUN-IN.

ENGINEER TASK ANALYSIS

TASK NO.	A.4	DIFFICULTY	3
TASK TITLE	INDEPENDENT BRAKING	HAZARD	B, C, E
SUB-TASK NO.	-	CRITICALITY	4
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	USE OF INDEPENDENT (LOCOMOTIVE) BRAKES TO CONTROL THE SPEED OF THE TRAIN	KNOWLEDGE CONCERNING SLACK CONFIGURATION OF TRAIN (e.g. STRETCHED, BUNCHED). TRAIN AND TRACK CONFIGURATION: (1) LOCOMOTIVE CONSIST (2) TRAIN CONSIST (3) GRADE, CURVATURE, ETC. WEATHER CONDITIONS SPEED LIMIT		DETERMINE THE NECESSITY FOR SLOWING THE SPEED OF THE LOCOMOTIVE WITH RESPECT TO THE CARS. (REFER TO TASK A-3) SO THAT THE LOCOMOTIVE(S) WILL NOT "RUN AWAY" FROM THE TRAIN. RECALL THAT THE INDEPENDENT BRAKE IS THE BRAKES FOR THE LOCOMOTIVE ONLY	PLACE BRAKE HANDLE TO DESIRED POSITION. THE OPERATING POSITIONS ARE (1) RELEASE AND (2) FULL APPLICATION. WITH AN APPLICATION ZONE IN BETWEEN.	INDEPENDENT BRAKE HANDLE.	OBSERVE DECREASE IN TRAIN SPEED ON SPEEDOMETER. AURALLY OBSERVE PRESSURE RELEASE OBSERVE CHANGE IN BRAKE CYLINDER PRESSURE.		BALANCES BRAKING EFFORT BETWEEN LOCOMOTIVE AND TRAIN CONSISTS.
2.	USE OF INDEPENDENT BRAKES TO (a) CONTROL LIGHT LOCOMOTIVE OR LOCOMOTIVE CONSIST (W/O CARS). (b) HANDLING CARS WITHOUT OPERATIVE AIR BRAKES ON THE CARS (e.g. SWITCHING OPERATIONS FOR YARD OR HUMP). (c) BUNCHING SLACK WHEN RUNNING OR APPROACHING A STOP. (d) STOPPING A TRAIN UNDER CERTAIN CIRCUMSTANCES, EVEN WHEN TRAIN AIR BRAKES ARE AVAILABLE.								

ENGINEMAN TASK ANALYSIS

TASK NO.	A. 5	DIFFICULTY	4
TASK TITLE	BRAKING WITH POWER	HAZARD	B, C, E
SUB-TASK NO.	-	CRITICALITY	4
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	COMBINED UTILIZATION OF THROTTLE AND AIR BRAKES TO CONTROL TRAIN SPEED. MAINTAIN LOW POWER SETTING (I.E. LOW THROTTLE NO.) AND MAKE AN INITIAL REDUCTION.	TRAIN SPEED. KNOWLEDGE OF TRAIN CONSIST, TRACK CONFIGURATION, SPEED LIMITS, SLACK LOCATION WITHIN TRAIN, ETC.	SPEEDOMETER	DETERMINATION THAT SITUATION IS SUCH THAT BRAKING AGAINST POWER CAN BE USED TO OBTAIN DESIRED SPEED REDUCTION.	PLACE AUTOMATIC BRAKE HANDLE TO DESIRED SERVICE POSITION. (INITIAL REDUCTION OF NOT LESS THAN 6 POUNDS).	AUTOMATIC BRAKE HANDLE.	TRAIN SLOWDOWN OCCURS, AS INDICATED BY SPEEDOMETER. BRAKE PIPE PRESSURE DECREASES AS INDICATED ON B.P. GAUGE.		IT IS BEST NOT TO USE THIS BRAKING TECHNIQUE IF OTHER BRAKING METHODS CAN BE UTILIZED
2.	RELEASE INDEPENDENT (LOCOMOTIVE) BRAKE.			KNOWLEDGE OF BRAKING OPERATIONS AGAINST POWER, RECALLING NECESSITY FOR KEEPING TRAIN STRETCHED.	PLACE INDEPENDENT BRAKE HANDLE IN "RELEASE" POSITION.	INDEPENDENT BRAKE HANDLE.	REDUCTION OF BRAKE CYLINDER PRESSURE.		DO NOT USE LOCOMOTIVE BRAKES
3.	GRADUALLY EASE OFF THROTTLE AFTER B.P. EXHAUST CEASES, MAINTAINING MODERATE PULLING AMPERAGE.	LOAD CURRENT.	LOAD CURRENT METER.	KNOWLEDGE THAT DRAW BAR PULL IS PROPORTIONAL TO LOAD CURRENT (MAINTAIN CONSTANT PULL BY MAINTAINING STEADY CURRENT).	ADJUST THROTTLE A NOTCH AT A TIME TO MAINTAIN CONSTANT CURRENT.	THROTTLE HANDLE, LOAD CURRENT METER.	CURRENT INDICATED ON LOAD METER STAYS WITHIN PRESCRIBED LIMITS. ON SOME UNITS, LIMITS ARE INDICATED BY COLOR CODING ON THE METER.		IF LOAD CURRENT BECOMES EXCESSIVE (I.E. DRAW BAR PULL TOO LARGE), TRAIN BREAK-IN-TWO COULD RESULT
4.	MAKE ADDITIONAL SERVICE REDUCTIONS.				PLACE AUTOMATIC BRAKE HANDLE TO DESIRED SERVICE POSITION.	AUTOMATIC BRAKE HANDLE.	AURAL AND AIR GAUGE INDICATION OF REDUCTIONS.		A MINIMUM OF A 12 POUND REDUCTION SHOULD BE MADE PRIOR TO RELEASING BRAKES

ENGINEERMAN TASK ANALYSIS

SHEET 1 OF 3

TASK NO.	A.6	DIFFICULTY	3
TASK TITLE	DYNAMIC BRAKING	HAZARD	B, C, E
SUB-TASK NO.	-	CRITICALITY	4
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)			CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT	FEEDBACK (RESULTS)		
1.	USE OF DYNAMIC BRAKING TO CONTROL TRAIN SPEED	TRACK PROFILE (DESCENDING GRADE, CURVES, TURNOUT, SWITCHES) TRAIN CONFIGURATION (E.G. CARS, BRAKE TYPE, ETC). SPEED LIMITS		KNOWLEDGE OF DYNAMIC BRAKING PRINCIPLES AND EFFECTIVE RANGE OF OPERATION (E.G. INEFFECTIVE AT LOW SPEEDS). NOTE THAT UNITS MAY BE EQUIPPED WITH EXTENDED RANGE DYNAMIC BRAKE WHICH PERMITS EVEN LOWER SPEED OPERATION. DETERMINATION THAT SPEED CONTROL BY DYNAMIC BRAKING IS REQUIRED MAXIMUM NUMBER OF AXLES PERMITTED IN DYNAMIC MODE?	PLACE THROTTLE TO "IDLE" POSITION. GRADUALLY TO ALLOW SLACK ADJUSTMENT. MOVE SELECTOR LEVER FROM NUMBER "1" TO "OFF".	THROTTLE SELECTOR LEVER.	OBSERVE THROTTLE POSITION INDICATOR, TRAIN SPEED ON SPEEDOMETER. SELECTOR POSITION INDICATOR.		SLACK ACTION CONTROL VERY IMPORTANT DYNAMIC BRAKING CONCENTRATES BRAKING AT HEAD END.
2	AFTER WAITING 10 SECONDS, SWITCH TO DYNAMIC BRAKING MODE OF OPERATION	TIME	WATCH	TIME DELAY REQUIRED TO PERMIT SATISFACTORY OPERATION OF DYNAMIC BRAKE.	MOVE SELECTOR LEVER TO POSITION "B". THE BRAKING POSITION	SELECTOR LEVER, LOAD CURRENT METER.	SELECTOR POSITION INDICATOR, SOME BRAKING EFFORT NOTED BY OBSERVATION OF LOAD CURRENT METER		DURING DYNAMIC BRAKING MODE LOAD CURRENT METER INDICATES AMOUNT OF DYNAMIC BRAKING

ENGINEER TASK ANALYSIS

SHEET 2 OF 3

TASK NO.	A. 6	DIFFICULTY	3
TASK TITLE	DYNAMIC BRAKING	HAZARD	B, C, E
SUB-TASK NO.	-	CRITICALITY	4
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
3.	CONTROL OF DYNAMIC BRAKING STRENGTH WITH THROTTLE	ROAD CONDITIONS (e.g. GRADE, CURVATURE, MOISTURE ON RAILS) AND TYPE OF TRAIN.		INCREASE DYNAMIC BRAKING STRENGTH SLOWLY UNTIL TRAIN IS PROPERLY BUNCHED.	ADVANCE THROTTLE FROM "IDLE" POSITION	THROTTLE, LOAD METER.	OBSERVE THROTTLE HANDLE POSITION AND LOAD CURRENT METER. DISTINCTIVE WHINING SOUND OF RESISTANCE GRID FANS IS HEARD. SPEEDOMETER.		IN DYNAMIC BRAKING MODE THROTTLE DOES NOT "NOTCH" BUT MOVES FREELY THROUGHOUT OPERATING RANGE
4.	DEVELOP MAXIMUM BRAKING EFFORT	TRAIN CONFIGURATION AND SPEED.	SPEEDOMETER	MAXIMUM BRAKING EFFORT VARIES AS A FUNCTION OF TRAIN TYPE AND SPEED AND TRACK CONFIGURATION	MOVE THROTTLE TO APPROPRIATE POSITION	THROTTLE, LOAD METER	OBSERVE LOAD CURRENT METER WHICH INDICATES MAXIMUM DYNAMIC BRAKING CURRENT.		MAXIMUM CURRENT IS FUNCTION OF SPECIFIC CURRENT LIMITING REGULATOR (~700 750 AMPS)
5.	OCCURRENCE OF EXCESSIVE BRAKING CURRENT ON LOCOMOTIVE WITH AUTOMATIC REGULATION FEATURE	EXCESSIVE BRAKING CURRENT.	LOAD CURRENT METER AND BRAKE WARNING LIGHT	OBSERVE EXCESSIVE CURRENT READING ON METER AND OR FLASHING BRAKE WARNING LIGHT.	RETARD THROTTLE SLOWLY.	THROTTLE	OBSERVE THAT BRAKE WARNING LIGHT GOES OUT		NOTE THAT IF THERE IS MORE THAN ONE LOCOMOTIVE IN THE CONSIST, THE BRAKE WARNING LIGHT INDICATES EXCESSIVE CURRENT IN ANY OF THE UNITS, NOT NECESSARILY THE LEAD UNIT.

ENGINEERMAN TASK ANALYSIS

SHEET 3 OF 3

TASK NO.	A 6	DIFFICULTY	3
TASK TITLE	DYNAMIC BRAKING	HAZARD	B. C. E
SUB-TASK NO.	-	CRITICALITY	4
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
6	COMBINED USE OF AIR-BRAKES AND DYNAMIC BRAKES	TRAIN SPEED	SPEEDOMETER	DECISION THAT DYNAMIC BRAKING IS BECOMING INEFFECTIVE (e.g. AT LOW SPEEDS) AND THAT ADDITIONAL BRAKING IS REQUIRED	MAKE MINIMUM AUTOMATIC BRAKE REDUCTION AND THEN ADDITIONAL REDUCTIONS AS REQUIRED FOR PROPER SPEED CONTROL.	AUTOMATIC BRAKE HANDLE	SPEED CONTINUES TO REMAIN STEADY OR DECREASE, AS DESIRED		BAIL INDEPENDENT BRAKE WHEN IN DYNAMIC BRAKING MODE TO KEEP AIR BRAKES RELEASED ON LOCOMOTIVE(S) IF INTERLOCKING NOT PROVIDED
7.	RELEASE THE DYNAMIC BRAKE COMPLETELY			DYNAMIC BRAKE INEFFECTIVE AND NO LONGER REQUIRED	MOVE THROTTLE HANDLE TO "IDLE" AND PLACE SELECTOR LEVER TO "OFF" OR NUMBER "1" POSITION.	THROTTLE, SELECTOR LEVER	OBSERVE THROTTLE AND SELECTOR LEVERS POSITION INDICATORS.		

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 3

TASK NO.	A 7	DIFFICULTY	3
TASK TITLE	BACKING UP	HAZARD	B, E
SUB-TASK NO.	A 7 1	CRITICALITY	3
SUB-TASK TITLE	BRAKE CONTROL FROM LOCOMOTIVE	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ESTABLISH CONTACT WITH CREW MEMBER ON CABOOSE OR REAR END CAR	CREW MEMBER AVAILABLE AT REAR END	VOICE, FLAG, RADIO, ETC	BACKING UP OF TRAIN IS REQUIRED OPERATION.	COMMUNICATE WITH CREW MEMBER, REVEALING INTENTION TO BACK UP.	VOICE, FLAG, RADIO, WHISTLE, ETC	TWO WAY COMMUNICATION ESTABLISHED	ASSISTANCE OF HEAD END CREW MEMBER, IF REQUIRED. CREW MEMBER ON REAR END	STOP MOVEMENT, IF COMMUNICATION LINK IS LOST
2.	DETERMINE DIRECTION OF MOVEMENT.			ONLY MOVE REVERSE LEVER IF TRAIN IS STOPPED	PLACE REVERSE LEVER TO "REVERSE" POSITION	REVERSE LEVER	REVERSE LEVER WINDOW INDICATOR		
3.	RELEASE TRAIN BRAKES			DO NOT ATTEMPT TO MOVE UNTIL TRAIN BRAKES ARE RELEASED.	MOVE AUTOMATIC BRAKE HANDLE TO "RELEASE" POSITION	AUTOMATIC BRAKE HANDLE.	CONFIRM RELEASE ON REAR END CAR BY COMMUNICATING WITH CREW MEMBER.	REAR END CREW MEMBER	
4.	APPLY POWER GRADUALLY.	BRAKES ARE COMPLETELY RELEASED	INFORMED BY CREW MEMBER.	OKAY TO APPLY POWER, APPLY SLOWLY TO PREVENT "BUCKLING" OF TRAIN	MOVE THROTTLE SLOWLY TO "RUN" POSITION, MONITOR LOAD CURRENT METER AND WHEEL SLIP INDICATOR	THROTTLE, LOAD CURRENT METER, WHEEL SLIP LIGHT	NO UNUSUAL CHANGE IN LOAD CURRENT		FOR RAPID OR UNUSUAL CURRENT, QUICKLY APPLY INDEPENDENT BRAKE AND CLOSE THE THROTTLE

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 3

TASK NO.	A 7	DIFFICULTY	3
TASK TITLE	BACKING UP	HAZARD	B. E
SUB-TASK NO.	A 7 1	CRITICALITY	3
SUB-TASK TITLE	BRAKE CONTROL FROM LOCOMOTIVE	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
5	STOP THE TRAIN.	SIGNAL FROM CREW MEMBER		DECISION OF WHICH BRAKING TECHNIQUE WILL BE USED (1) TRAIN BRAKES (2) LOCOMOTIVE BRAKES (3) COMBINATION OF TRAIN AND LOCOMOTIVE BRAKES.	MAKE LIGHT BRAKE PIPE REDUCTION WITH AUTOMATIC BRAKE USE POWER AS REQUIRED MAKE ADDITIONAL SMALL REDUCTIONS AS REQUIRED PLACE INDEPENDENT BRAKE IN "RELEASE" POSITION	AUTOMATIC BRAKE HANDLE	PROPER TRAIN HANDLING INDICATED BY PROPER SLACK CONTROL (i.e. SLACK DOES NOT RUN OUT)		AVOID HEAVY BRAKE PIPE REDUCTIONS WHEN BACKING UP
5 1	STOP, USING TRAIN AIR BRAKES	SIGNAL FROM CREW MEMBER		DECISION TO STOP USING TRAIN AIR BRAKES		THROTTLE AUTOMATIC BRAKE HANDLE INDEPENDENT BRAKE HANDLE			
5 2	STOP, USING LOCOMOTIVE AIR BRAKES	SIGNAL FROM CREW MEMBER		DECISION TO STOP USING LOCOMOTIVE BRAKES	SLOWLY CLOSE THROTTLE LIGHTLY APPLY INDEPENDENT BRAKES CONTINUE LIGHT APPLICATIONS OF INDEPENDENT BRAKES.	THROTTLE, INDEPENDENT BRAKE HANDLE	PROPER SLACK ACTION WITHIN TRAIN IS NOTICED	CREW MEMBER AT REAR END OF TRAIN	
5 3	STOP, USING BOTH TRAIN AND LOCOMOTIVE BRAKES.	SIGNAL FROM CREW MEMBER.		DECISION TO STOP USING TRAIN AND LOCOMOTIVE BRAKES	REFER TO STEPS 5.1 AND 5.2.	THROTTLE, AUTOMATIC BRAKE HANDLE, INDEPENDENT BRAKE HANDLE.	PROPER TRAIN HANDLING RESULTS.		

ENGINEMAN TASK ANALYSIS

SHEET 3 OF 3

TASK NO.	A.7	DIFFICULTY	3
TASK TITLE	BACKING UP	HAZARD	B. E
SUB-TASK NO.	A.7.1	CRITICALITY	3
SUB-TASK TITLE	BRAKE CONTROL FROM LOCOMOTIVE	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
5 4	TRAIN COMPLETELY STOPPED.	SIGNAL FROM REAR END.		TRAIN AT REST.	CLOSE THROTTLE AND APPLY INDEPENDENT BRAKE.	THROTTLE, INDEPENDENT BRAKE HANDLE.			

ENGINEMAN TASK ANALYSIS

TASK NO.	A. 7	DIFFICULTY	4
TASK TITLE	BACKING UP	HAZARD	B. E
SUB-TASK NO.	A. 7.2	CRITICALITY	4
SUB-TASK TITLE	BRAKE CONTROL FROM REAR END CAR	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	INSURE PROPER OPERATION OF BACK-UP DEVICE (e.g. VALVE OR HOSE).	BACK-UP DEVICE ON REAR END IS INSTALLED.	COMMUNICATION FROM REAR END CAR.	DECISION TO CONTROL BRAKING FROM REAR END IS THE DESIRED MODE OF OPERATION.	APPLY INDEPENDENT BRAKE PLACE AUTOMATIC BRAKE HANDLE TO RELEASE POSITION	INDEPENDENT BRAKE HANDLE. AUTOMATIC BRAKE HANDLE			THIS TASK REQUIRES CLOSE COORDINATION BETWEEN ENGINEMAN AND TRAINMAN
2.	RECEIVE INFORMATION THAT BRAKES HAVE APPLIED AND THEN RELEASED ON REAR CAR.	SIGNAL FROM TRAINMAN			ALLOW B.P. PRESSURE TO BE RESTORED TO NORMAL VALUE.		OBSERVE B.P. AIR GAUGE.	CREW MEMBER IN REAR END CAR.	
3.	FOLLOWING SIGNAL TO PROCEED, START BACK-UP PROCEDURES.	SIGNAL FROM CREW MEMBER		OKAY TO COMMENCE BACK-UP OPERATION WITH BACK-UP DEVICE CONTROLLING BRAKING FROM REAR END.	RELEASE INDEPENDENT BRAKE. MAINTAIN AUTOMATIC BRAKE IN RELEASE.	INDEPENDENT AND AUTOMATIC BRAKE HANDLES	AURAL SOUNDS OF BRAKE RELEASE. BRAKE CYLINDER PRESSURE GAUGE READING DECREASES.	CREW MEMBER IN REAR END CAR.	
4.	APPLY POWER TO START TRAIN MOVING BACKWARD.			REDUCE POWER TO PREVENT WHEEL SLIP AND/OR EXCESSIVE LOAD CURRENT.	GRADUALLY MOVE THROTTLE TO APPLY POWER, MAINTAINING POWER UNTIL TRAIN IS STOPPED.	THROTTLE, LOAD CURRENT METER, WHEEL SLIP INDICATOR, AIR GAUGES	OBSERVE LOAD CURRENT CHANGES AND WHEEL SLIP INDICATOR. MONITOR AIR GAUGES FOR INDICATION OF AIR BEING APPLIED FROM REAR END.		
5.	TRAIN STOPPED.				APPLY INDEPENDENT BRAKE. MOVE THROTTLE TO "IDLE" MAKE FULL SERVICE REDUCTION WITH AUTOMATIC BRAKE. RESTORE AIR.	INDEPENDENT AND AUTOMATIC BRAKE HANDLES, THROTTLE.	OBSERVE THAT TRAIN HAS COMPLETELY STOPPED.	NOTIFICATION OF STOP FROM CREW MEMBER ON REAR END CAR.	

ENGINEMAN TASK ANALYSIS

TASK NO.	A. 8	DIFFICULTY	1
TASK TITLE	SANDING	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	SANDING THE NO. 1 TRUCK OF THE LEAD UNIT OF THE CONSIST.	WHEELS ARE SLIPPING. LOAD CURRENT INCREASING.	WHEEL SLIP INDICATOR. LOAD CURRENT METER.	SANDING IS REQUIRED TO IMPROVE TRACTION.	PLACE SANDING NO. 1 TRUCK TOGGLE SWITCH ON. AFTER REDUCING THROTTLE SETTING.	SANDING NO. 1 TRUCK SWITCH. THROTTLE.	PNEUMATIC SOUND OF SANDING IS HEARD. TRACTION IMPROVES		ONLY FOR SANDING OF LEAD LOCOMOTIVE SANDING OCCURS DURING EMERGENCY BRAKE APPLICATIONS AND WHEEL SLIPPING. IF UNITS ARE SO EQUIPPED
2.	SAND ALL LOCOMOTIVES OF THE CONSIST.	WHEELS ARE SLIPPING. LOAD CURRENT INCREASING	WHEEL SLIP INDICATOR. LOAD CURRENT METER.	ADDITIONAL SANDING OF ALL LOCOMOTIVES IN CONSIST IS REQUIRED TO IMPROVE TRACTION. DIRECTION OF MOVEMENT IS KNOWN	REDUCE THROTTLE AND PLACE SAND LEVER IN EITHER "FWD" OR "REV" CORRESPONDING TO DIRECTION OF MOVEMENT.	SAND LEVER	PNEUMATIC SOUND OF SANDING IS HEARD. TRACTION IMPROVES		SANDING OF ALL LOCOMOTIVES IN CONSIST IF SANDING CONTROL IS TRAINLINEO ALWAYS SAND WHEN STOPPING!

ENGINEMAN TASK ANALYSIS

TASK NO.	B.1	DIFFICULTY	1
TASK TITLE	REGISTERING	HAZARD	-
SUB-TASK NO.	B.1.1	CRITICALITY	2
SUB-TASK TITLE	REGISTER ON DUTY	DURATION	30 SECONDS
		FREQUENCY	PRIOR TO EACH MISSION

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ENTER NAME AND OTHER REQUIRED INFORMATION ON SIGN-IN BOARD.	NAME AND OTHER REQUIRED INFORMATION.	REGISTRATION OR SIGN-IN BOARD.	KNOWLEDGE THAT REGISTERING ON DUTY IS A REQUIRED TASK, PRIOR TO DEPARTURE ON SCHEDULED RUN.	WRITE REQUIRED INFORMATION ON THE SIGN-IN FORM.	WRITING IMPLEMENTS AND SIGN-IN BOARD.	VISUAL OBSERVATION THAT SIGN-IN HAS BEEN ACCOMPLISHED.		PUNCTUALITY IMPORTANT.
2.	READ BULLETINS AND OTHER SPECIAL NOTICES.	NECESSARY REGISTRATION PROCEDURE.		REALIZES IMPORTANCE OF KNOWING INFORMATION CONTAINED ON SPECIAL NOTICES AND BULLETINS.	READ MATERIAL AND SIGN OR INITIAL REQUIRED FORMS THAT HE HAS READ ALL REQUIRED SPECIAL INSTRUCTION.	BULLETIN BOARDS AND/OR BOOKS.			LACK OF KNOWLEDGE RELATIVE TO SPECIAL INSTRUCTIONS MIGHT LEAD TO PERSONAL INJURY OR DAMAGE.

ENGINEMAN TASK ANALYSIS

TASK NO.	B.1	DIFFICULTY	2
TASK TITLE	REGISTERING	HAZARD	-
SUB-TASK NO.	B.1.2	CRITICALITY	2
SUB-TASK TITLE	PRE-PLAN MISSION	DURATION	10 15 MINUTES
		FREQUENCY	PRIOR TO EACH MISSION

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	PRE-PLAN MISSION AS THOROUGHLY AS POSSIBLE, BASED UPON AVAILABLE INFORMATION.	TRAIN ORDERS, SPECIAL ORDERS, TRACK MAINTENANCE REPORTS, WEATHER CONDITIONS, REQUIREMENT FOR PUSHERS, SPECIAL SPEED RESTRICTIONS, SCHEDULED STOPS, SPECIAL OPERATING INSTRUCTIONS, ETC.	MAPS, ESTIMATED SCHEDULE, WRITTEN ORDERS, BULLETIN BOARD, ETC.	PRE-PLAN MISSION FOR OPTIMUM OPERATION, BASED ON AVAILABLE INPUTS.	DISCUSS WITH CONDUCTOR ANY SPECIAL DECISIONS, ANTICIPATED PROBLEMS, ETC.		RECEIVE AUTHORITY (IF REQUIRED) TO PROCEED WITH MISSIONS AS PLANNED OR WITH MODIFICATIONS	CONDUCTOR AND TERMINAL PERSONNEL.	PRE-PLANNING DETERMINES TO A LARGE EXTENT THE DEGREE OF SUCCESS WITH WHICH A MISSION IS COMPLETED
2.	USE AND UNDERSTAND RAILROAD TECHNOLOGY AND OPERATING PROCEDURES FOR PROPER COMMUNICATION.	SCHEDULE, SPECIAL ORDERS, KNOWLEDGE OF RAILROAD RULES AND REGULATIONS.	TRAIN OR SPECIAL ORDERS	ENGINEMAN MUST BE ABLE TO UNDERSTAND THE MEANING OF SPECIAL LANGUAGE (SLANG) TYPICALLY USED IN THE OPERATION OF THE RAILROAD. UNDERSTANDING OF ORDERS AND OPERATING PROCEDURES.	NOTIFY CREW MEMBERS OF WORK TO BE PERFORMED IN ROUTE AS REQUIRED.	VARIOUS FORMS		COMMUNICATIONS WITH CREW MEMBERS REGARDING WORK ASSIGNMENTS, ETC. TERMINAL PERSONNEL AND CREW MEMBERS.	A MISUNDERSTANDING OF AN ORDER OR ORAL COMMUNICATION COULD RESULT IN AN ACCIDENT

ENGINEER TASK ANALYSIS

TASK NO.	B.1	DIFFICULTY	2
TASK TITLE	REGISTERING	HAZARD	-
SUB-TASK NO.	B.1.3	CRITICALITY	2
SUB-TASK TITLE	PREPARATION OF PAPERWORK	DURATION	5 TO 10 MINUTES
		FREQUENCY	PRIOR TO EACH MISSION

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	PREPARE NECESSARY PAPERWORK AS REQUIRED BY RULES AND REGULATIONS.	AWARENESS OF WHICH FORMS ARE REQUIRED, WHEN, AND BY WHOM.	REQUIRED FORMS.	KNOWLEDGE OF HOW TO COMPLETE THE REQUIRED FORMS.	COMPLETE FORMS AND DELIVER TO PROPER PERSONNEL.	REQUIRED FORMS.	RECEIPT OF FORMS ACKNOWLEDGED BY PROPER PERSONNEL.	TERMINAL PERSONNEL.	PUNCTUALITY AND ACCURACY ARE KEY ITEMS ALSO, LEGIBILITY.

ENGINEMAN TASK ANALYSIS

TASK NO.	B.1	DIFFICULTY	1
TASK TITLE	REGISTERING	HAZARD	-
SUB-TASK NO.	B.1.4	CRITICALITY	2
SUB-TASK TITLE	VERIFY TIME PIECE	DURATION	30 SECONDS
		FREQUENCY	PRIOR TO MISSION

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	VERIFY THAT WATCH AGREES WITH RAILROAD STANDARD TIME.	TIME OF DAY.	STANDARD CLOCK IN RAILROAD TERMINAL.	REALIZATION THAT KNOWLEDGE OF ACCURATE TIME IS IMPORTANT TO TRAIN OPERATIONS.	COMPARE WATCH WITH STANDARD CLOCK AND ADJUST, IF REQUIRED.	ENGINEMAN'S WATCH AND STANDARD CLOCK.	TIME PIECES ARE IN AGREEMENT		
2.	CHECK TIME WITH CONDUCTOR.				COMPARE TIME DN WATCHES.	WATCHES.	TIME PIECES ARE IN AGREEMENT	ENGINEMAN AND CONDUCTOR.	PERFORMS DOUBLE CHECK THAT BOTH ENGINEMAN AND CONDUCTOR HAVE COMPARED WATCHES WITH THE RAILROAD STANDARD CLOCK.

ENGINEMAN TASK ANALYSIS

TASK NO.	B.1	DIFFICULTY	1
TASK TITLE	REGISTERING	HAZARD	-
SUB-TASK NO.	B.1.5	CRITICALITY	1
SUB-TASK TITLE	REPORT TO RECEIVE CONSIST	DURATION	5 TO 10 MINUTES
		FREQUENCY	PRIOR TO MISSION

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	REPORT TO TERMINAL PERSONNEL TO RECEIVE POWER (LOCOMOTIVE CONSIST) AND INITIATE INSPECTION OF UNIT(S).	COMPLETION OF ALL PRE-TRIP PLANNING FUNCTIONS.		KNOWLEDGE THAT ALL PRE PLANNING FUNCTIONS HAVE BEEN SATISFACTORILY ACCOMPLISHED.	REPORT FOR RECEIPT OF LOCOMOTIVE CONSIST.		DELIVERY OF CONSIST TO ENGINEMAN. AFTER VERIFYING THAT ALL PRIOR FUNCTIONS HAVE BEEN SATISFACTORILY COMPLETED.	TERMINAL OR YARD PERSONNEL.	

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 4

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE-TRIP INSPECTION**	HAZARD	F
SUB-TASK NO.	B.2.1	CRITICALITY	5
SUB-TASK TITLE	WALK-AROUND INSPECTION*	DURATION	APPROXIMATELY 10 MIN. PER LOCOMOTIVE
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1	CHECK LOCOMOTIVE HANDBRAKE.	VISUAL OBSERVATION AND MANUAL TEST.		INSURE THAT LOCOMOTIVE HANDBRAKE IS APPLIED.	VISUAL INSPECTION AND MANUAL TEST.	HAND BRAKE.			
2.	CHECK FOR LEAKAGE OF FUEL OIL, LUBE OIL, WATER OR AIR.	VISUAL OBSERVATION AND SMELL.		DETERMINE LOCATION AND REASON FOR LEAK, IF POSSIBLE.	FOR INFLAMMABLE LEAKS, IMMEDIATELY ALERT PERSONNEL AND TAKE PRECAUTIONARY ACTION TO PREVENT FIRES. NOTIFY MAINTENANCE PERSONNEL OF OTHER LEAKS.		OBSERVE THAT CONDITION HAS BEEN CORRECTED.	ALERT YARD AND CREW PERSONNEL..	SAFETY AFFECTED.
3.	CHECK FOR LOOSE OR DRAGGING PARTS.	VISUAL CUES, MAINLY.	LOCOMOTIVE.	DECIDE SERIOUSNESS OF OBSERVED LOOSE EQUIPMENT AND DETERMINE WHETHER THE CONDITION MUST BE CORRECTED, EITHER BY SELF OR MAINTENANCE PERSONNEL.	IF PROBLEM EXISTS, CORRECT IF POSSIBLE OR ADVISE MAINTENANCE PERSONNEL.		RECHECK FOLLOWING REPAIR OR CORRECTION OF OBSERVED CONDITION.	CREW WITH MAINTENANCE OR YARD PERSONNEL.	POSSIBLE DAMAGE TO LOCOMOTIVE OR TRAIN IF NOT THOROUGH DURING INSPECTION

* NOTE: DEPENDENT UPON OPERATING PROCEDURES OF SPECIFIC RAILS, THE WALK-AROUND INSPECTION MAY BE PERFORMED BY PERSONNEL OTHER THAN THE ENGINEMAN.

** NOTE: THE LOCOMOTIVE ENGINEER SHALL NORMALLY BE RESPONSIBLE FOR THIS INSPECTION.

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 4

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE-TRIP INSPECTION	HAZARD	F
SUB-TASK NO.	B.2.1	CRITICALITY	5
SUB-TASK TITLE	WALK-AROUND INSPECTION	DURATION	APPROXIMATELY 10 MIN PER LOCOMOTIVE
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
4.	CHECK HOSES BETWEEN UNITS IN MULTIPLE.	VISUAL OBSERVATION.	LOCOMOTIVE HOSES: a) BRAKE PIPE b) AIR EQUALIZING PIPE c) APPLICATION AND RELEASE PIPE. d) ACTUATING PIPE e) SMOOTHER PIPE	DETERMINE IF PROPER PIPE CONNECTION EXISTS ON HOSES.	WALK TO COUPLER OF EACH LOCOMOTIVE, INSPECT HOSES.	HOSES.	OBSERVE PROPER PIPE CONNECTION.	ASSISTED BY OTHER CREW MEMBERS (E.G. FIREMAN, BRAKEMAN, ETC.)	INADEQUATE BRAKE OPERATION COULD OCCUR IF NOT ADEQUATELY CHECKED.
5.	CHECK ANGLE COCKS AND VALVES, INCLUDING TRUCK BRAKE CYLINDER COCKS.	VISUAL OBSERVATION.	BRAKE CONNECTIONS.	REQUIRES KNOWLEDGE OF THE PROPER POSITIONS FOR THE ANGLE COCKS AND VALVES.	WALK TO COUPLER OF EACH LOCOMOTIVE AND OBSERVE VALVES.	ANGLE COCKS AND VALVES.	OBSERVE POSITION OF LEVER OF ANGLE COCKS AND VALVES.	ASSISTED BY OTHER CREW MEMBERS (E.G. FIREMAN, BRAKEMAN, ETC.)	INADEQUATE BRAKE OPERATION COULD OCCUR IF NOT ADEQUATELY CHECKED.
6.	DRAIN MAIN AIR RESERVOIR.			KNOWLEDGE OF PROCEDURE FOR DRAINING WATER FROM AIR RESERVOIR.	OPERATE DRAIN COCKS.	DRAIN COCKS.	OBSERVE AIR STREAM FREE OF WATER.		THIS STEP IMPORTANT FOR PREVENTING CORROSION PROBLEMS IN AIR BRAKE SYSTEM.

ENGINEMAN TASK ANALYSIS

SHEET 3 OF 4

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE-TRIP INSPECTION	HAZARD	F
SUB-TASK NO.	B.2.1	CRITICALITY	5
SUB-TASK TITLE	WALK-AROUND INSPECTION	DURATION	APPROXIMATELY 10 MIN. PER LOCOMOTIVE
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
7.	CHECK BRAKE SHOES, RIGGING, AND PISTON.	VISUAL OBSERVATION.	BRAKE SHOES, RIGGING, AND PISTON.	DETERMINATION OF BRAKE SHOE CONDITION. NECESSARY TO KNOW WHAT CONDITIONS TO LOOK FOR.	WALK AROUND EACH LOCOMOTIVE AND LOOK AT EACH BRAKE SHOE.		CONFIRM THAT THE BRAKE SHOES ARE INSTALLED PROPERLY AND THAT THEY ARE SERVICEABLE.		IF UNSATISFACTORY, IMPROPER BRAKE OPERATION MAY OCCUR. THIS ASSUMES THAT THE ENGINE IS RUNNING AND THAT THE INDEPENDENT BRAKE IS APPLIED.
8.	CHECK THE FUEL TANK GAUGES.	VISUAL CUE.	FUEL TANK SIGHT GLASS.	DOES REQUIRED PISTON TRAVEL EXIST FOR APPLIED BRAKES? DETERMINATION IF INDICATED FUEL QUANTITY IS SUFFICIENT FOR SATISFACTORY COMPLETION OF MISSION. KNOWLEDGE CONCERNING FUEL CONSUMPTION OF LOCOMOTIVES IS REQUIRED.	ALSO LOOK AT EACH BRAKE CYLINDER PISTON. ADVISE PROPER PERSONNEL THAT MORE FUEL IS REQUIRED IF THIS DECISION IS REACHED		CONFIRM THAT THE BRAKE PISTON IS EXTENDED IF INDEPENDENT BRAKES ARE SET. RECHECK GAUGE.		PREVENTS RUNNING OUT OF FUEL
9.	CHECK FOR PROPER INSTALLATION OF CONTROL JUMPER CABLES BETWEEN UNITS.	VISUAL INSPECTION.	JUMPER CABLE.	ENGINEMAN MUST KNOW THAT THE CONTROL CABLE IS REQUIRED IF THE FOLLOWING UNITS ARE TO RESPOND TO CONTROL BY THE LEAD UNIT.	WALK TO LOCOMOTIVE COUPLERS. OBSERVE CONTROL CABLE; CHECK TO SEE IF IT IS INSTALLED INTO SOCKET AS FAR AS POSSIBLE.	CONTROL CABLE.	CONFIRM THAT CABLE IS FULLY INSERTED INTO SOCKET.		IMPROPER ELECTRICAL SYSTEM OPERATION IF NOT INSTALLED.

ENGINEMAN TASK ANALYSIS

SHEET 4 OF 4

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE-TRIP INSPECTION	HAZARD	F
SUB-TASK NO.	B.2.1	CRITICALITY	5
SUB-TASK TITLE	WALK-AROUND INSPECTION	DURATION	APPROXIMATELY 10 MIN. PER LOCOMOTIVE
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
10.	CHECK SAND QUANTITY.	VISUAL OBSERVATION.	SAND BOXES AND ASSOCIATED HOSES.	DETERMINE IF PROPER QUANTITY OF SAND IS IN SAND BOXES. INSURE THAT AIR HOSE CONNECTIONS TO SANDBOX ARE SATISFACTORY.	IF SAND QUANTITY IS INSUFFICIENT. INSURE PROPER AMOUNT ADDED. TIGHTEN CONNECTIONS IF REQUIRED OR ADVISE MAINTENANCE PERSONNEL.		RECHECK SAND QUANTITY IF MORE ADDED.	CREW WITH MAINTENANCE OR YARD PERSONNEL.	REQUIRED FOR IMPROVED TRACTIVE EFFORT.
11.	CHECK TO SEE IF PLATFORM SAFETY CHAINS ARE ATTACHED.	VISUAL OBSERVATION AND MANUAL TEST.	PLATFORM SAFETY CHAINS.	ARE SAFETY CHAINS PROPERLY INSTALLED?	WALK TO PLATFORM AREA AND INSPECT SAFETY CHAINS.		OBSERVE SAFETY CHAINS FOR PROPER INSTALLATION.		

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 5

TASK NO.	B.2
TASK TITLE	PRE-TRIP INSPECTION
SUB-TASK NO.	B.2.2
SUB-TASK TITLE	LEAD UNIT CAB INSPECTION

DIFFICULTY	3
HAZARD	A
CRITICALITY	4
DURATION	5 TO 7 MINUTES
FREQUENCY	PRIOR TO STARTING ENGINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CHECK FOR CLOSURE OF MAIN BATTERY SWITCH AND GROUND RELAY KNIFE SWITCH.	VISUAL OBSERVATION.	SWITCH AND FUSE PANEL.	DETERMINATION IF SWITCHES ARE CLOSED.	OPEN PANEL DOOR TO GAIN ACCESS TO SWITCH AND FUSE PANEL.		OBSERVE THAT MAIN BATTERY SWITCH AND GROUND RELAY KNIFE SWITCH ARE CLOSED.		CAUTION MUST BE EXERCISED WHILE OPERATING NEAR HIGH VOLTAGES (e.g. 600 VOLTS)
2.	CHECK THAT ALL FUSES ARE INSTALLED AND IN GOOD CONDITION. ALSO CHECK CONDITION OF SPARE FUSES.	OBSERVATION AND UTILIZATION OF FUSE TEST CIRCUITRY.	SWITCH AND FUSE PANEL.	KNOWLEDGE OF OPERATION OF FUSE TEST CIRCUITRY.	REMOVE FUSES AND APPLY TO FUSE TEST TERMINALS. OPERATE FUSE TEST SWITCH.	FUSE TEST CIRCUITRY.	OBSERVE FUSE TEST LIGHT.		ESPECIALLY CHECK GENERATOR FIELD FUSES.
3.	CHECK POSITION OF CIRCUIT BREAKERS.	VISUAL OBSERVATION. THE FOLLOWING SHOULD BE IN THE ON POSITION. A) CONTROL C.B. B) LOCAL CONTROL C.B. C) FUEL PUMP C.B. D) TURBO LUBE PUMP C.B.	CIRCUIT BREAKER PANEL.	DETERMINATION IF PROPER CIRCUIT BREAKERS ARE IN ON POSITION	OPEN PANEL DOOR TO GAIN ACCESS TO CIRCUIT BREAKER PANEL WHICH IS NEAR THE SWITCH AND FUSE PANEL.	CIRCUIT BREAKERS.	VISUALLY OBSERVE THAT THE CIRCUIT BREAKERS ARE IN CLOSED POSITIONS.		REQUIRED FOR PROPER ENGINE STARTING.

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 5

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE-TRIP INSPECTION	HAZARD	A
SUB-TASK NO.	B.2.2	CRITICALITY	4
SUB-TASK TITLE	LEAD UNIT CAB INSPECTION	DURATION	5 TO 7 MINUTES
		FREQUENCY	PRIOR TO STARTING ENGINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
4.	CHECK THE POSITION OF OTHER REQUIRED CIRCUIT BREAKERS (e.g. LIGHTS, ETC.)	VISUAL OBSERVATION.	CIRCUIT BREAKER PANEL.	DETERMINATION IF CIRCUIT BREAKERS ARE IN ON POSITION.	CHECK CIRCUIT BREAKERS IN THE SWITCH AND FUSE PANEL AND IN THE ENGINE CONTROL PANEL.	CIRCUIT BREAKERS.	VISUALLY OBSERVE THAT THE CIRCUIT BREAKERS ARE IN THE PROPER POSITIONS.		IF CIRCUITS ARE NOT ACTIVE, SOME VITAL EQUIPMENT, LIKE HEADLIGHT, RADIO, OR OTHER AUXILIARY EQUIPMENT WILL NOT WORK.
5.	PLACE HEADLIGHT CONTROL SWITCH TO THE PROPER POSITION FOR LEAD UNIT OPERATION. PLACE OTHER REQUIRED SWITCHES AND CIRCUIT BREAKERS TO ON POSITION.			KNOWLEDGE OF CORRECT OPERATION OF SWITCHES.	OPERATE HEADLIGHT CONTROL SWITCH AND OTHER REQUIRED CIRCUIT BREAKERS.	CONTROL SWITCHES AND CIRCUIT BREAKERS ON ENGINE CONTROL PANEL.	OBSERVE HEADLIGHT IS ON.		HEADLIGHT AND CLASSIFICATION LIGHTS NEEDED FOR OPERATION.
6.	PLACE THE CONTROL AND FUEL PUMP SWITCH TO ON POSITION.			ENGINEMAN MUST KNOW THAT THIS IS PART OF THE STARTING PROCEDURE.	OPERATION OF SWITCH, IF ENGINE NOT ALREADY RUNNING.	CONTROL STANO.	OBSERVE SWITCH POSITIONS.		REQUIRED FOR ENGINE START SEQUENCE.

ENGINEMAN TASK ANALYSIS

SHEET 3 OF 5

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE-TRIP INSPECTION	HAZARD	A
SUB-TASK NO.	B.2.2	CRITICALITY	4
SUB-TASK TITLE	LEAD UNIT CAB INSPECTION	DURATION	5 TO 7 MINUTES
		FREQUENCY	PRIOR TO STARTING ENGINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
7.	CHECK THROTTLE POSITION.	VISUAL OBSERVATION.	CONTROL STAND.	DETERMINE THAT THROTTLE IS IN THE "IDLE" POSITION.	MOVE THROTTLE TO "IDLE" POSITION, IF NOT ALREADY THERE.	THROTTLE LEVER.	OBSERVE "IDLE" IN THROTTLE WINDOW DISPLAY.		IF THROTTLE IS NOT IN "IDLE" POSITION, THE LOCOMOTIVE ENGINE COULD RUN AT TOO HIGH RPM WHEN STARTED AND BE DAMAGED DUE TO LOW CRANKCASE OIL PRESSURE.
8.	POSITION THE AUTOMATIC BRAKE HANDLE TO THE PROPER POSITION.			KNOWLEDGE OF ALL AUTOMATIC BRAKE HANDLE POSITIONS.	INSERT AUTOMATIC BRAKE VALVE HANDLE (IF REMOVED) AND PLACE HANDLE IN RELEASE POSITION.	AUTOMATIC BRAKE HANDLE.	VISUALLY OBSERVE THAT HANDLE IS IN RELEASE POSITION		THE BRAKE VALVE OPERATES IN ALL POSITIONS AND DEVICES REGULATING PRESSURES PROPERLY PERFORM THAT FUNCTION.

ENGINEMAN TASK ANALYSIS

SHEET 4 OF 5

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE TRIP INSPECTION	HAZARD	A
SUB-TASK NO.	B.2.2	CRITICALITY	4
SUB-TASK TITLE	LEAD UNIT CAB INSPECTION	DURATION	5 TO 7 MINUTES
		FREQUENCY	PRIOR TO STARTING ENGINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
9.	SET INDEPENDENT BRAKE VALVE TO "FULL APPLICATION" POSITION.			KNOWLEDGE OF INDEPENDENT BRAKE HANDLE POSITIONS.	INSERT INDEPENDENT BRAKE HANDLE (IF REMOVED) AND MOVE TO "FULL APPLICATION" POSITION.	INDEPENDENT BRAKE HANDLE.	VISUALLY OBSERVE THAT INDEPENDENT BRAKE VALVE HANDLE IS IN "FULL APPLICATION" POSITION.		IF ENGINE IS RUNNING, OBSERVE THAT B.C. PRESSURE GAUGE IS AT PRESCRIBED VALUE.
10.	SET CUT OFF VALVE TO APPROPRIATE POSITION.			ENGINEMAN MUST KNOW IF THE LOCOMOTIVE CONSIST IS PREPARED FOR PASSENGER OR FREIGHT SERVICE.	PUT CUT OFF VALVE IN THE REQUIRED POSITION TO CUT IN BRAKES.	BRAKE PIPE CUT-OFF VALVE..	VISUALLY OBSERVE CUT OFF VALVE OR COCKS TO DETERMINE PROPER SETTING HAS BEEN MADE.		PASSENGER AND FREIGHT BRAKES ARE VERY DIFFERENT AND REQUIRE DIFFERENT ARRANGEMENTS.
11.	PLACE THE MU-2-A VALVE TO PROPER POSITION.			ENGINEMAN MUST KNOW IF THIS UNIT WILL BE THE LEAD UNIT.	PLACE THE MU VALVE IN THE LEAD POSITION.	MU-2-A VALVE (FOR 28L BRAKE EQUIPMENT)	VISUAL OBSERVATION.		MU VALVE, IF NOT PROPERLY SET, WILL CAUSE IMPROPER BRAKE OPERATION THROUGHOUT CONSIST

ENGINEMAN TASK ANALYSIS

SHEET 5 OF 5

TASK NO. B.2
 TASK TITLE PRE-TRIP INSPECTION
 SUB-TASK NO. B.2.2
 SUB-TASK TITLE LEAD UNIT CAB INSPECTION

DIFFICULTY 3
 HAZARD A
 CRITICALITY 4
 DURATION 5 TO 7 MINUTES
 FREQUENCY PRIOR TO STARTING ENGINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
12.	PLACE DYNAMIC BRAKE CIRCUIT BREAKER IN THE "ON" POSITION.			ENGINEMAN MUST KNOW THAT IF THIS CIRCUIT BREAKER IS OPEN, NO DYNAMIC BRAKING IS POSSIBLE.	PLACE BREAKER IN "UP" POSITION OR OBSERVE THAT IT IS IN "UP" POSITION.	DYNAMIC BRAKE CIRCUIT BREAKER.	VISUALLY OBSERVE POSITION OF BREAKER.		NO DYNAMIC BRAKES CAN BE DEVELOPED UNLESS THIS CIRCUIT BREAKER IS CLOSED.
13.	CHECK TO SEE THAT NECESSARY EQUIPMENT IS IN THE LOCOMOTIVE CAB.			REALIZATION THAT CERTAIN EQUIPMENT MAY BE REQUIRED DURING TRAIN OPERATIONS AND/OR REQUIRED BY RULES AND REGULATIONS TO BE IN THE CAB.	VISUAL OBSERVATION OF THE FOLLOWING ITEMS: A) FLAGS B) TORPEDOS C) FIRST AID KIT D) TOOLS E) FUSES F) FIRE EXTINGUISHER G) RADIO/TELEPHONE HAND SET				REQUIRED WARNING AND COMMUNICATION DEVICES TO INSURE SAFETY DURING TRAIN OPERATIONS.

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 2

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE-TRIP INSPECTION	HAZARD	A
SUB-TASK NO.	B.2.3	CRITICALITY	4
SUB-TASK TITLE	TRAILING UNIT CAB INSPECTION	DURATION	2 TO 3 MINUTES PER UNIT
		FREQUENCY	PRIOR TO STARTING ENGINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	TASKS SAME AS FOR LEAD UNIT, * EXCEPT AS NOTED BY THE FOLLOWING STEPS: PLACE THE FOLLOWING SWITCHES TO "OFF" POSITION: A) CONTROL & FUEL PUMP SWITCH. B) GENERATOR FIELD SWITCH. C) ENGINE RUN SWITCH.			ENGINEMAN MUST KNOW PROPER WAY TO SET UP AN ENGINE FOR TRAILING OPERATION.	MOVE SWITCHES TO "OFF" POSITION.	A) CONTROL & FUEL PUMP SWITCH. B) GENERATOR FIELD SWITCH. C) ENGINE RUN SWITCH.	OBSERVATION OF SWITCH POSITION.		PERFORM INSPECTION ON EACH TRAILING UNIT. INSURES PROPER TRAIL OPERATION
2.	PLACE THE OPERATING LEVERS TO THE FOLLOWING POSITIONS: A) THROTTLE - IDLE B) SELECTOR LEVER - OFF			ENGINEMAN MUST UNDERSTAND THE INTERLOCKING CHARACTERISTICS OF THE LEVERS. ENGINEMAN WANTS TO PREVENT ANY ACCIDENTAL MOVEMENT OF LOCOMOTIVE.	MOVE LEVERS TO THE REQUIRED POSITIONS.	THROTTLE AND SELECTOR LEVER.	VISUAL OBSERVATION OF LEVER POSITION INDICATORS.		INSURES PROPER TRAIL OPERATION
3.	REMOVE REVERSE LEVER FROM CONTROLLER.				REMOVE LEVER FROM CONTROLLER WHILE IT IS IN NEUTRAL POSITION IF IT HAS NOT ALREADY BEEN REMOVED.	REVERSE LEVER ON CONTROL STAND.	VISUALLY OBSERVE THAT HANDLE IS REMOVED AND STORED IN THE PROPER POSITION.		TRAILING UNIT WILL FAIL TO RESPOND TO LEAD CONTROL IF TRAILING UNIT IS NOT PROPERLY SET

* REFER TO SUB-TASK NO. B.2.2

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 2

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE-TRIP INSPECTION	HAZARD	A
SUB-TASK NO.	B.2.3	CRITICALITY	4
SUB-TASK TITLE	TRAILING UNIT CAB INSPECTION	DURATION	2 TO 3 MINUTES PER UNIT
		FREQUENCY	PRIOR TO STARTING ENGINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
4.	PLACE THE BRAKE HANDLES AND VALVES IN THE PROPER POSITIONS.			ENGINEMAN MUST HAVE KNOWLEDGE OF PROPER BRAKE POSITIONS.	MOVE LEVERS AND VALVES TO FOLLOWING POSITIONS A) AUTOMATIC BRAKE - HANDLE OFF (THEN REMOVE). B) INDEPENDENT BRAKE - FULL RELEASE (THEN REMOVE). C) MU VALVE - POSITION FOR TRAILING OPERATION. D) CUTOFF VALVE - "CUTOFF" POSITION.	AUTOMATIC BRAKE, INDEPENDENT BRAKE, MU VALVE AND CUTOFF VALVE.	VISUALLY OBSERVE THAT LEVERS AND VALVES ARE IN PROPER POSITIONS.		INSURES PROPER TRAIL OPERATION FOR 26L BRAKE EQUIPMENT
5.	PLACE "HEADLIGHT CONTROL" TO PROPER POSITION.			ENGINEMAN MUST KNOW CORRECT HEADLIGHT CONTROL POSITION.	PLACE SWITCH INTO "CONTROLLED FROM ANOTHER UNIT COUPLED AT EITHER END" POSITION.	HEADLIGHT CONTROL.	VISUAL OBSERVATION THAT SWITCH IS IN PROPER POSITION.		PERMIT PROPER HEADLIGHT CONTROL FROM HEAD END

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 2

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE TRIP INSPECTION	HAZARD	A, H
SUB-TASK NO.	B.2.4	CRITICALITY	4
SUB-TASK TITLE	ENGINE ROOM INSPECTION*	DURATION	2 TO 2.5 MINUTES
		FREQUENCY	PRIOR TO STARTING ENGINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CHECK AIR COMPRESSOR FOR PROPER LUBRICATING OIL SUPPLY.			KNOWLEDGE THAT UNIT IS PROVIDED WITH VISUAL INDICATORS.	REMOVE DIP STICK AND/OR OBSERVE PRESSURE GAUGE.	OIL LEVEL DIP STICK AND AIR COMPRESSOR LUBE OIL PRESSURE GAUGE.	VISUAL OBSERVATION OF PROPER LEVEL.		LOW OIL IN AIR COMPRESSOR COULD RESULT IN DAMAGE TO AIR COMPRESSOR
2.	OBSERVE FOR PROPER WATER LEVEL ON TANK SIGHT GLASS.				OBSERVE WATER LEVEL.	SIGHT GLASS ON WATER TANK.	IF WATER LEVEL IS NOT OBSERVED, THE RESERVOIR MUST BE RESTORED TO PROPER LEVEL.		LOW WATER DETECTOR MAY TRIP AT ENGINE START IT MUST BE RESET IMMEDIATELY
3.	CHECK TO SEE THAT THE OVERSPEED TRIP LEVER IS SET.			THE ENGINE WILL NOT START IF TRIPPED.	MOVE LEVER TO SET POSITION, IF NOT PRESENTLY SET.	ENGINE OVERSPEED TRIP LEVER.	OBSERVE THAT LEVER IS SET.		PREVENTS ENGINE DAMAGE IF OVERSPEED RESULTS
4.	OBSERVE THAT THE GOVERNOR LOW OIL PRESSURE TRIP BUTTON IS SET AND THAT THERE IS OIL VISIBLE IN THE GOVERNOR SIGHT GLASS.			ENGINEMAN MUST KNOW THAT IF PRESSURE TRIP BUTTON IS NOT SET, THE ENGINE WILL DIE RIGHT AFTER START UP.	SET PRESSURE TRIP BUTTON IF NOT ALREADY SET.	GOVERNOR LOW OIL PRESSURE TRIP BUTTON.	VISUAL OBSERVATION THAT TRIP BUTTON IS SET.		

* NOTE THIS SUB-TASK IS WRITTEN, ASSUMING ENGINE HAS TO BE STARTED. HOWEVER, INSPECTION OF THE ENGINE ROOM MAY BE PERFORMED WHEN ENGINE IS RUNNING.

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 2

TASK NO.	B.2	DIFFICULTY	3
TASK TITLE	PRE-TRIP INSPECTION	HAZARD	A, H
SUB-TASK NO.	B.2.4	CRITICALITY	4
SUB-TASK TITLE	ENGINE ROOM INSPECTION*	DURATION	2 TO 2.5 MINUTES
		FREQUENCY	PRIOR TO STARTING ENGINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
5.	OBSERVE THAT THE CRANK CASE (OIL PAN) PRESSURE AND LOW WATER DETECTOR RESET BUTTONS ARE SET (PRESSED IN).			ENGINEMAN MUST KNOW THAT IF OIL/WATER RESET BUTTON IS NOT SET, THE ENGINE WILL DIE RIGHT AFTER STARTUP.	PRESS IN AND HOLD FOR 5 SECONDS (IF PROTRUDING) AFTER ENGINE STARTS.	CRANK CASE PRESSURE AND LOW WATER DETECTOR RESET BUTTONS	VISUAL OBSERVATION THAT BUTTONS ARE PRESSED IN.		
6.	OBSERVE THE ENGINE TOP DECK, AIR BOX AND OIL PAN INSPECTION COVERS ARE FIRMLY SECURED IN PROPER POSITION.			KNOWLEDGE OF COVERS AND PROPER POSITIONING IS REQUIRED.	FIRMLY SECURE COVERS IF REQUIRED.	INSPECTION COVERS, ENGINE TOP DECK, AIR BOX, AND OIL PAN.	VISUAL OBSERVATION AND MANUAL TEST.		PERSONAL INJURY OR ENGINE DAMAGE COULD RESULT IF ANY OF THESE COVERS ARE NOT IN THE PROPER PLACE.

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 2

TASK NO.	B.3	DIFFICULTY	4
TASK TITLE	STARTING ENGINE	HAZARD	H
SUB-TASK NO.	B.3.1	CRITICALITY	4
SUB-TASK TITLE	ENGINE STARTING SEQUENCE	DURATION	APPROXIMATELY 1 MINUTE
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CHECK THAT BARRING OVER DEVICE IS STORED IN PROPER POSITION.			REALIZATION THAT ENGINE DAMAGE WILL RESULT IF BARRING OVER DEVICE IS STILL ATTACHED.	CHECK LOCATION OF BARRING OVER DEVICE.	BARRING OVER DEVICE.			
2.	PLACE THE ISOLATION SWITCH IN THE START POSITION.	KNOWLEDGE OF THE SWITCH OPERATION AND STARTING SEQUENCE.		ENGINEMAN MUST KNOW THAT THIS IS PART OF THE STARTING PROCEDURE.	OPERATE SWITCH.	ISOLATION SWITCH OR ENGINE CONTROL PANEL.	OBSERVE SWITCH IN THE START POSITION.		STARTING INHIBITED IF NOT IN PROPER POSITION.
3.	OPERATION OF LAYSHAFT LEVER AND START SWITCH.	KNOWLEDGE OF STARTING PROCEDURE.		ENGINEMAN MUST KNOW THAT THIS IS PART OF THE STARTING PROCEDURE. IF CRANKING SPEED IS NOT REACHED IN 4 SECONDS, STOP CRANKING TO PREVENT OVERHEATING. ALSO CHECK FOR HYDRAULIC LOCK.	WHILE HOLDING THE LAYSHAFT LEVER, MOVE THE FUEL PRIME/ENGINE START SWITCH TO THE ENGINE START POSITION. WHEN THE CRANKING SPEED AUTOMATICALLY INCREASES (ABOUT 4 SECONDS) MOVE THE LAYSHAFT LEVER SO THAT THE POINTER READS ABOUT 1.6 ON THE SCALE.	LAYSHAFT LEVER AND ENGINE START SWITCH.	INCREASE IN CRANKING SPEED (AURAL INPUT). AURAL SOUND OF AIR PRESSURE BLOWING OUT AIR COMPRESSOR DRAIN VALVE UNTIL PRESSURE REACHES PROPER VALUE.		

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 2

TASK NO.	B.3	DIFFICULTY	4
TASK TITLE	STARTING ENGINE	HAZARD	H
SUB-TASK NO.	B.3.1	CRITICALITY	4
SUB-TASK TITLE	ENGINE STARTING SEQUENCE	DURATION	APPROXIMATELY 1 MINUTE
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
4.	RELEASE THE LAYSHAFT LEVER AS SOON AS THE GOVERNOR CONTROL OF THE INJECTOR LINKAGE IS FELT AT THE LEVER.	TACTILE OBSERVATION OF GOVERNOR CONTROL OF INJECTOR LINKAGE IN THE LEVER HANDLE	LAYSHAFT LEVER.	KNOWLEDGE CONCERNING TACTILE OBSERVATION. IF ENGINE DOES NOT START IN 20 SECONDS AFTER FREE CRANKING, RELEASE THE STARTING SWITCH. ALLOW 2 MINUTES BETWEEN CRANKING ATTEMPTS TO PERMIT ADEQUATE COOLING OF STARTING MOTORS.	RELEASE LEVER.	LAYSHAFT LEVER.	LEVER RETURNS TO NORMAL POSITION.		
5.	IMMEDIATELY AFTER ENGINE STARTS, CHECK RESET BUTTONS ON DETECTOR AND HOLD IN FOR 5 SECONDS IF NEEDED.	AURAL INDICATION THAT ENGINE IS RUNNING.	ENGINE.	KNOWLEDGE OF ENGINE STARTING SEQUENCE.	IF REQUIRED, PRESS IN RESET BUTTONS..	RESET BUTTONS ON DETECTOR.	VISUAL OBSERVATION.		REQUIRED FOR ENGINE PROTECTION.
6.	RESTARTING ENGINE IF IT HAS SHUTDOWN DURING THE RUN.	ENGINE SHUT-DOWN.		DECISION THAT IT IS SAFE TO ATTEMPT RESTART OF ENGINE.	PERFORM NORMAL STARTING PROCEDURES.			ADVISE CREW IF RESTART IS TO BE ATTEMPTED.	CAUTION: CONTINUED ATTEMPTS TO RESTART AN ENGINE THAT HAS JUST SHUT DOWN IS EXCEEDINGLY DANGEROUS AND MAY LEAD TO AN EXPLOSION AND FIRE.

ENGINEMAN TASK ANALYSIS

TASK NO.	B.3	DIFFICULTY	3
TASK TITLE	STARTING ENGINE	HAZARD	-
SUB-TASK NO.	B.3.2	CRITICALITY	3
SUB-TASK TITLE	LUBRICANT AND COOLING LEVEL CHECK	DURATION	50 TO 70 SECONDS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CHECK THAT ENGINE OIL PRESSURE, ENGINE OIL LEVEL, AND GOVERNOR OIL LEVEL ARE SATISFACTORY ON ALL ENGINES.			KNOWLEDGE OF SATISFACTORY OPERATION i.e. REQUIRED PRESSURE, AND LEVELS.	READ PRESSURE GAUGE, REMOVE DIP STICKS AND OBSERVE.	PRESSURE GAUGE AND LEVEL DETECTORS i.e., DIP STICKS.	COMPARE VISUAL OBSERVATION WITH REQUIRED CONDITIONS.		REQUIRED FOR PROPER ENGINE OPERATION AND LUBRICATION
2.	CHECK THAT THE ENGINE COOLING WATER LEVEL DOES NOT FALL BELOW THE "LOW" MARK ON THE "ENGINE RUNNING" PORTION OF THE WATER LEVEL GAUGE PLATE ON ALL ENGINES.	VISUAL OBSERVATION.	WATER LEVEL GAUGE PLATE.	DETERMINE IF ADDITIONAL WATER IS NEEDED. IF THE WATER LEVEL IS LOW, THE ENGINE WILL SHUT DOWN WHEN THROTTLE IS ADVANCED.	IF LEVEL IS LOW, ADD REQUIRED AMOUNT OF WATER.		CORRECT WATER LEVEL READING.		

ENGINEMAN TASK ANALYSIS

TASK NO.	B.4	DIFFICULTY	3
TASK TITLE	POST-START INSPECTION*	HAZARD	H
SUB-TASK NO.	B.4.1	CRITICALITY	4
SUB-TASK TITLE	ENGINE ROOM INSPECTION	DURATION	1 TO 2 MINUTES
		FREQUENCY	AFTER ENGINE START

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	REPEAT THE FOLLOWING ENGINE ROOM INSPECTION TASKS B.2.4. STEPS 3 THROUGH 6								

* IT IS IMPORTANT THAT THE ENGINE IS INSPECTED BOTH BEFORE AND AFTER STARTING!

ENGINEMAN TASK ANALYSIS

TASK NO.	8.4	DIFFICULTY	3
TASK TITLE	POST-START INSPECTION	HAZARD	-
SUB-TASK NO.	B.4.2	CRITICALITY	3
SUB-TASK TITLE	LEAD CAB INSPECTION	DURATION	2 TO 3 MINUTES
		FREQUENCY	AFTER ENGINE START

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	PERFORM AN INSPECTION OF THE LEAD CAB, LOOKING SPECIFICALLY FOR MALFUNCTIONS* OR ABNORMAL OPERATION. REFER TO TASK B.2.2 AS A GUIDE. *NOTE: SPECIFIC TASKS RELATIVE TO MALFUNCTIONS ARE DESCRIBED IN MAJOR TASK GROUPING F.	REFERENCE TASK B.2.2		DECISION THAT ALL LEAD CAB EQUIPMENT AND FUNCTIONS ARE PERFORMING SATISFACTORILY.					
2.	CHARGE MAIN RESERVOIR (REQUIRED WHEN ENGINEMAN STARTS THE ENGINE).	REFERENCE TASK B.6.2 STEPS 2 AND 3.		DECISION THAT MAIN RESERVOIR NEEDS TO BE CHARGED.			OBSERVE AIR GAUGES.		

ENGINEER TASK ANALYSIS

TASK NO.	B.5	DIFFICULTY	1
TASK TITLE	PREPARATION AND INITIAL MOVEMENT OF LOCOMOTIVE	HAZARD	-
SUB-TASK NO.	B.5.1	CRITICALITY	4
SUB-TASK TITLE	PLACE UNIT ON LINE	DURATION	5 SECONDS PER UNIT
		FREQUENCY	WHEN PLACING UNIT ON LINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1-	TO PLACE UNIT ON LINE, PUT THE ISOLATION SWITCH TO THE "RUN" POSITION.			DECISION THAT THE LOCOMOTIVE CONSIST IS READY TO BE PUT INTO SERVICE.	SET THE ISOLATION SWITCH TO THE "RUN" POSITION ON ALL UNITS OF THE CONSIST.	ISOLATION SWITCH ON THE ENGINE CONTROL PANEL.	VISUAL OBSERVATION OF SWITCH POSITION.		MAKE SURE THAT THROTTLE IS IN "IDLE" POSITION BEFORE GOING ON LINE.

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 4

TASK NO.	B 5	DIFFICULTY	3
TASK TITLE	PREPARATION INITIAL MOVEMENT OF LOCOMOTIVES*	HAZARD	-
SUB-TASK NO.	B 5 2	CRITICALITY	3
SUB-TASK TITLE	PREPARATION FOR INITIAL MOVEMENT	DURATION	2 TO 3 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CHECK MAIN RESERVOIR AIR PRESSURE GAUGE AND ADJUST BRAKE PIPE REGULATOR CONTROL	VISUAL OBSERVATION.	MAIN RESERVOIR DUPLIX GAUGE.	KNOWLEDGE OF ALL AIR GAUGES DETERMINE THAT ADEQUATE AIR PRESSURE IS AVAILABLE FOR STOPPING PRIOR TO INITIAL MOVEMENT	LOCATE THE PROPER AIR GAUGE AND INTERPRET THE NEEDLE POSITION INTO AN AIR PRESSURE VALUE ADJUST BRAKE PIPE REGULATOR TO OBTAIN EQUALIZING RESERVOIR PRESSURE OF 90 PSI	BRAKE PIPE RESERVOIR CONTROL	VISUAL OBSERVATION OF AIR GAUGES (1) M R PRESSURE (2) E R PRESSURE		CORRECT AIR PRESSURE REQUIRED FOR SATISFACTORY AIR BRAKE OPERATION
2.	CHECK PROPER APPLICATION AND RELEASE OF AIR BRAKES			KNOWLEDGE OF BRAKE SYSTEM, APPLICATION AND RELEASE POSITIONS	OPERATION OF BRAKE HANDLES CONFIRM THAT VISUAL INSPECTION OF EACH LOCOMOTIVE BRAKE SHOES AND PISTON TRAVEL HAS BEEN PERFORMED.	AIR BRAKE LEVERS BRAKE SHOES AND PISTONS	OBSERVATION OF AIR GAUGES AND AURAL INDICATION THAT BRAKES ARE APPLIED AND RELEASED ASCERTAIN THAT PISTON TRAVEL IS ADEQUATE FOR BOTH APPLICATION AND RELEASE OF LOCOMOTIVE BRAKES	COMMUNICATION WITH YARD PERSONNEL OF CREW MEMBER.	REQUIRED FOR SATISFACTORY BRAKE OPERATION
3	CHECK PRESSURE GAUGES FOR PRESCRIBED VALUES			ASCERTAIN ALL GAUGES ARE AT PROPER LEVELS	READ THE INDICATED AIR GAUGES.	B C. PRESSURE GAUGE B P. PRESSURE GAUGE E R PRESSURE GAUGE	READINGS ARE WITHIN PRESCRIBED LIMITS.		IMPORTANCE OF MONITORING AIR PRESSURES CONTINUOUSLY DURING TRAIN OPERATIONS

*NOTE IN CERTAIN CASES, SOME OF THESE STEPS ARE PERFORMED AND CERTIFIED BY MAINTENANCE PERSONNEL. THE ENGINEMAN IS THEN REQUIRED TO REVIEW CERTIFIED FORMS TO CONFIRM THAT TASK WAS PERFORMED.

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 4

TASK NO.	B.5	DIFFICULTY	2
TASK TITLE	PREPARATION AND INITIAL MOVEMENT OF LOCOMOTIVES	HAZARD	-
SUB-TASK NO.	B.5.2	CRITICALITY	3
SUB-TASK TITLE	PREPARATION FOR INITIAL MOVEMENT	DURATION	2 TO 3 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
4.	RELEASE LOCOMOTIVE HANO BRAKES AND REMOVE WHEEL BLOCKS, IF UTILIZED.	HANO BRAKE IS SET.	HANO BRAKE.	KNOWLEDGE OF HANO BRAKE OPERATION.	RELEASE HANO BRAKE AND REMOVE WHEEL BLOCKS.	HANO BRAKE AND WHEEL BLOCKS.	VISUAL OBSERVATION.		INDEPENDENT AIR BRAKE MUST BE FULLY SET BEFORE HANO BRAKE IS RELEASED
5.	SET ENGINE RUN SWITCH AND GENERATOR FIELD SWITCH TO "ON" POSITIONS.	THROTTLE IS IN "IDLE" POSITION.	THROTTLE WINDOW INDICATOR.	DECISION THAT ALL PRELIMINARY PRECAUTIONS PRIOR TO INITIAL MOVEMENT HAVE BEEN OBSERVED.	OPERATION OF SWITCHES.	ENGINE RUN AND GENERATOR FIELD SWITCHES.	VISUAL OBSERVATION OF SWITCH POSITIONS.		LOCOMOTIVE CANNOT BE MOVED WITHOUT THESE SWITCHES ON.
6.	PLACE HEADLIGHTS, CLASSIFICATION LIGHTS, AND OTHER LIGHTS ON AS REQUIRED.			DETERMINATION OF WHICH SWITCHES ARE REQUIRED.	OPERATION OF SWITCHES.	REQUIRED SWITCHES, CIRCUIT BREAKERS, ETC.	VISUAL OBSERVATION OF LIGHTS.		
7.	SET REVERSE LEVER CONTROL FOR DESIRED DIRECTION OF TRAVEL.			DETERMINATION OF INITIAL DIRECTION OF MOVEMENT REQUIRED.	INSERT REVERSE LEVER AND MOVE TO DESIRED DIRECTION OF TRAVEL.	REVERSE LEVER.	VISUAL OBSERVATION		ONLY CHANGE DIRECTION OF TRAVEL WHEN LOCOMOTIVE HAS COMPLETELY STOPPED

ENGINEERMAN TASK ANALYSIS

SHEET 3 OF 4

TASK NO.	B.5	DIFFICULTY	2
TASK TITLE	PREPARATION AND INITIAL MOVEMENT OF LOCOMOTIVES	HAZARD	-
SUB-TASK NO.	B.5.2	CRITICALITY	3
SUB-TASK TITLE	PREPARATION FOR INITIAL MOVEMENT	DURATION	2 TO 3 MINUTES
		FREQUENCY	AS REQUIRED.

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
8.	PLACE SELECTOR LEVER IN THE "1" POSITION.			ENGINEERMAN MUST KNOW THAT THE SELECTOR LEVER MUST BE IN POSITION "1" BEFORE ENGINE CAN DEVELOP POWER TO THE TRACTION MOTORS.	OPERATION OF THE SELECTOR LEVER.	SELECTOR LEVER.	OBSERVE CORRECT NUMBER IN THE SELECTOR LEVER WINDOW.		SELECTOR LEVER IS MECHANICALLY INTERLOCKED WITH REVERSE LEVER AND TENDRILL CONTROL
9.	ACTIVATE SAFETY CONTROL DEVICES, IF AVAILABLE.			ENGINEERMAN MUST UNDERSTAND THE FUNCTION OF THE SYSTEM.	TOUCH METAL OR ACTIVATE SWITCH	SAFETY DEVICES.	NO SOUND OF PENALTY BRAKE WHISTLE WHEN BRAKE HANDLE IS RELEASED FROM THE SUPPRESSION POSITION.		THIS STEP NECESSARY TO PREVENT INADVERTENT SAFETY BRAKE APPLICATION
10.	OPERATE SANDING LEVERS.			ENGINEERMAN MUST CONFIRM THAT SANDING EQUIPMENT IS WORKING PROPERLY..	OPERATE SANDING LEVERS (1) SANDING LEVER TO FORWARD AND REVERSE POSITIONS. (2) LEAD TRUCK SANDING SWITCH TO ON. CHECK FOR SAND WEAR APPROPRIATE TRUCKS.	SANDING LEVER, LEAD TRUCK SANDING SWITCH.	AIR SOUND OF SANDERS OPERATING. VISUAL OBSERVATION OF SAND ON THE RAILS. OBSERVATION THAT THE SAND LIGHT ILLUMINATES.	COMMUNICATE WITH YARD PERSONNEL OR CREW MEMBER.	SANDING IMPROVES TRACTIVE EFFORT

ENGINEMAN TASK ANALYSIS

SHEET 4 OF 4

TASK NO.	B.5	DIFFICULTY	2
TASK TITLE	PREPARATION AND INITIAL MOVEMENT OF LOCOMOTIVES	HAZARD	-
SUB-TASK NO.	B.5.2	CRITICALITY	3
SUB-TASK TITLE	PREPARATION FOR INITIAL MOVEMENT	DURATION	2 TO 3 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
11.	CHECK THE OPERATION OF THE FOLLOWING EQUIPMENT (1) WHISTLE (2) TRAIN BELL (3) RED SIGNAL LIGHT (4) RADIO/TELEPHONE	REFER TO TASK GROUPING G FOR DESCRIPTION OF THESE TASKS.		REQUIRED PRIOR TO INITIAL MOVEMENT OF LOCOMOTIVE.	MAKE A 10 POUND REDUCTION.	AUTOMATIC BRAKE HANDLE.	OBSERVE 10 POUND REDUCTION ON B.P. GAUGE.		REFERENCE TASK B.5.3 STEPS 4 THROUGH 7 FOR SIMILAR PROCEDURES.
12.	PERFORM LOCOMOTIVE BRAKE PIPE LEAKAGE TEST.			TO PASS TEST, B.P. LEAKAGE MUST NOT EXCEED 3 POUNDS PER MINUTE.	PLACE CUT-OFF VALVE TO THE CUT-OUT POSITION. MONITOR B.P. GAUGE FOR ONE MINUTE.	CUT-OFF VALVE. B.P. GAUGE, WATCH.	OBSERVE B.P. GAUGE.		

ENGINEMAN TASK ANALYSIS

TASK NO.	8.5	DIFFICULTY	3
TASK TITLE	PREPARATION AND INITIAL MOVEMENT OF LOCOMOTIVES	HAZARD	-
SUB-TASK NO.	8.5.3	CRITICALITY	5
SUB-TASK TITLE	INITIAL MOVEMENT	DURATION	1.5 TO 2 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RELEASE AIR BRAKES.			ENGINEMAN MUST DECIDE THAT ALL BRAKES CAN BE RELEASED, SAFELY AND THE TRAIN IS READY TO MOVE.	MOVE BOTH BRAKE HANDLES TO THE RELEASE POSITION.	AIR BRAKE HANDLES. AUTOMATIC AND INDEPENDENT.	VISUAL OBSERVATION OF AURAL INDICATION OF AIR RELEASE. OBSERVATION OF BRAKE PIPE FLOW METER.		ENGINEMAN MUST BE READY TO HANDLE THE LOCOMOTIVE IF IT STARTS TO MOVE WITH BRAKE RELEASED.
2.	ADVANCE THROTTLE TO RUN 1, 2 OR 3 AS REQUIRED TO MOVE THE LOCOMOTIVE CONSIST.	OBSERVATION THAT LOCOMOTIVE IS MOVING SMOOTHLY (WITHOUT WHEEL SLIP, ETC.)		DETERMINATION OF SATISFACTORY MOVEMENT OR NECESSARY CORRECTIONS.	OPERATE THROTTLE. APPLY SAND, ADJUST THROTTLE ETC., AS REQUIRED.	THROTTLE LEVER, SANDING LEVER(S).	"SEAT-OF-THE-PANTS" FEELING BASED ON RECALL OF PREVIOUSLY EXPERIENCED MOTION SENSATIONS.		OPERATION OF THE LOCOMOTIVE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3.	MAKE RUNNING TEST OF LOCOMOTIVE AIR BRAKES.				OPERATE INDEPENDENT BRAKE HANDLE IN APPLICATION ZONE.	INDEPENDENT BRAKE HANDLE.	OBSERVE AURAL SOUNDS AND B.C. PRESSURE GAUGE.		NECESSARY TO CHECK BRAKES BEFORE SPEED BECOMES EXCESSIVE.
3a.	MAKE RUNNING TEST OF DYNAMIC BRAKES.	REFER TO TASK A.6 FOR DESCRIPTION							
4.	MOVE THE LOCOMOTIVE CONSIST TO THE POSITION REQUIRED FOR COUPLING TO THE TRAIN. OBSERVING ALL REGULATIONS REQUIRED FOR YARD OPERATIONS.	VISUAL OBSERVATION DURING YARD MOVEMENT. LOCATION OF TRAIN.		KNOWLEDGE OF YARD OPERATIONS RULES AND REGULATIONS.	PROPER OPERATION OF LOCOMOTIVE CONSIST WITHIN YARD.	SIGNAL LIGHTS, FLAG SIGNALS, RADIO TELEPHONE HAND SIGNALS, ETC		COMMUNICATION WITH TERMINAL PERSONNEL	

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 2

TASK NO.	B. 6	DIFFICULTY	4
TASK TITLE	FORMING THE CONSIST	HAZARD	D, C, E
SUB-TASK NO.	B. 6.1	CRITICALITY	5
SUB-TASK TITLE	COUPLING TO THE TRAIN	DURATION	DEPENDENT UPON TRAIN LOCATION AND MAKE-UP
		FREQUENCY	DURING TRAIN MAKE-UP

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MOVE THE LOCOMOTIVE CONSIST TO THE POSITION REQUIRED FOR COUPLING TO THE TRAIN. OBSERVING ALL REGULATIONS REQUIRED FOR YARD OPERATIONS	VISUAL OBSERVATION DURING YARD MOVEMENT LOCATION OF TRAIN.	WORKMEN AND/OR FLAGMAN IN THE AREA.	KNOWLEDGE OF YARD OPERATIONS, RULES AND REGULATIONS	PROPER OPERATION OF LOCOMOTIVE CONSIST PRIOR TO COUPLING.	LOCOMOTIVE CONSIST CONTROL, HAND SIGNALS, WALKIE TALKIE.		ASSISTANCE FROM YARD PERSONNEL	COUPLING ONLY UNDER PROPER INSTRUCTION
2.	BACK LOCOMOTIVE CONSIST INTO TRAIN TO PERFORM COUPLING.				AS GENTLY AS POSSIBLE, APPLY POWER TO CAUSE LOCOMOTIVE TO COUPLE TO TRAIN	THROTTLE	INSURE THAT COUPLING HAS OCCURRED.		ROUGH COUPLINGS MAY CAUSE EQUIPMENT AND LADING DAMAGE
3.	AFTER COUPLING TO THE TRAIN TEST FOR LOCKED COUPLERS BY STRETCHING CONNECTION.	"FEEL" THAT COUPLING IS COMPLETE		INFORMATION FROM YARD PERSONNEL THAT COUPLING IS COMPLETE.	MOVE TRAIN SLOWLY TO STRETCH CONNECTION.	LOCOMOTIVES, THROTTLE, REVERSE LEVER, AIR BRAKE CONTROLS	OBSERVATION (VISUAL AND OR "FEEL") THAT TRAIN IS FIRMLY COUPLED.	YARD PERSONNEL, FIREMAN OR BRAKEMAN WILL ASSIST IN CONNECTING UP AIR HOSES AND OPENING ANGLE COCK SLOWLY.	POOR COUPLING MAY CAUSE BREAK-IN-TWO.
4.	CONFIRM THAT AIR BRAKE HOSES ARE CONNECTED.			KNOWLEDGE THAT HOSE CONNECTIONS ARE REQUIRED.	CHECK THAT BRAKE PIPE AIR HOSES ARE CONNECTED.		VISUAL OBSERVATION AND MANUAL TEST KNOWLEDGE THAT ANGLE COCKS AND VALVES ARE OPEN.	YARD PERSONNEL	NECESSARY FOR SATISFACTORY BRAKE OPERATION
5.	APPLY INDEPENDENT BRAKE.				PLACE INDEPENDENT BRAKE HANDLE TO FULL APPLICATION.	INDEPENDENT BRAKE HANDLE.			

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 2

TASK NO.	B 6	DIFFICULTY	4
TASK TITLE	FORMING THE CONSIST	HAZARD	B. C. E
SUB-TASK NO.	B 6 1	CRITICALITY	5
SUB-TASK TITLE	COUPLING TO THE TRAIN	DEPENDENT UPON TRAIN LOCATION AND MAKE-UP DURING TRAIN MAKE-UP	

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
6	INFORM PERSONNEL TO RELEASE HAND BRAKES IN CARS	TRAIN IS SECURED TO PREVENT ROLLING		INDEPENDENT BRAKE IS ADEQUATE TO HOLD TRAIN FROM MOVING	ADVISE PERSONNEL TO RELEASE HAND BRAKES	RADIO VERBAL OR HAND SIGNALS		YARD PERSONNEL OR CREW MEMBERS	

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 2

TASK NO.	B. 6	DIFFICULTY	3
TASK TITLE	FORMING THE CONSIST	HAZARD	B, C, E
SUB-TASK NO.	B. 6. 2	CRITICALITY	5
SUB-TASK TITLE	PUMPING UP AIR	DURATION	DEPENDENT UPON TRAIN LOCATION AND MAKE-UP
		FREQUENCY	DURING TRAIN MAKE-UP

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ADVISE CREW PERSONNEL TO SLOWLY OPEN THE AIR VALVES ON THE LOCOMOTIVE AND TRAIN TO CUT IN BRAKES.	KNOWLEDGE OF TRAIN AIR (i.e. PRECHARGED BY YARD PLANT).	PRESSURE GAUGES	DETERMINATION THAT IT IS SAFE TO COUPLE THE AIR.	COMMUNICATE WITH GROUND CREW.	RADIO, VERBAL OR HAND SIGNALS.	VISUAL, TACTILE AND AURAL OBSERVATION BY GROUND CREW THAT VALVES ARE OPENED.	GROUND CREW PERSONNEL.	IMPROPER OPERATION OF OPENING THE ANGLE COCK COULD A) RELEASE TRAIN BRAKES. B) SEND TRAIN INTO EMERGENCY
2.	DETERMINE NECESSITY OF PUMPING UP AIR	MAIN RESERVOIR PRESSURE, BRAKE PIPE PRESSURE.	PRESSURE GAUGES (M. R. AND B. P.)	PUMPING REQUIRED IF MAIN RESERVOIR PRESSURE IS LESS THAN TRAINLINE PRESSURE.	OBSERVE GAUGES	GAUGES	INDICATED GAUGE READINGS.		REQUIRED FOR PROPER BRAKE OPERATION.
3.	PLACE GENERATOR FIELD SWITCH TO "OFF" POSITION TO PREVENT TRAIN MOVEMENT.	EQUALIZING RESERVOIR PRESSURE, BRAKE PIPE PRESSURE AND MAIN RESERVOIR PRESSURE.	AIR GAUGES	KNOWLEDGE OF PUMPING PROCEDURES.	PLACE SWITCH TO "OFF" POSITION ADVANCE THROTTLE.	GENERATOR FIELD SWITCH. THROTTLE.	VISUAL OBSERVATION. ENGINE RUNS UP		THIS STEP PREVENTS THE LOCOMOTIVE FROM SUPPLYING POWER TO TRACTION MOTORS

ENGINEER TASK ANALYSIS

SHEET 2 OF 2

TASK NO.	B. 6	DIFFICULTY	3
TASK TITLE	FORMING THE CONSID	HAZARD	B. C. E
SUB-TASK NO.	B. 6.2	CRITICALITY	5
SUB-TASK TITLE	PUMPING UP AIR	DURATION	DEPENDENT UPON TRAIN LOCATION AND MAKE-UP
		FREQUENCY	DURING TRAIN MAKE-UP

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
4.	TERMINATE PUMPING.	PRESSURES (MAIN AND BRAKE PIPE)	GAUGES.	MONITOR PRESSURES TO DETERMINE THAT PUMPING IS COMPLETE (MAIN PRESSURE BRAKE PIPE PRESSURE).	RETARD THROTTLE TO "IDLE".	THROTTLE	ENGINE RUNS DOWN		AFTER TRAIN IS PUMPED UP, NORMAL CYCLING OF THE AIR COMPRESSOR WILL BE OBSERVED ON THE M R. GAUGE

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 5

TASK NO.	B. 6	DIFFICULTY	3
TASK TITLE	FORMING THE CONSIST	HAZARD	B. C
SUB-TASK NO.	B. 6. 3	CRITICALITY	4
SUB-TASK TITLE	BRAKE PIPE LEAK TEST	DURATION	5 TO 7 MINUTES *
	(INITIAL TERMINAL AIR BRAKE TEST)	FREQUENCY	PRIOR TO TRAIN MOVEMENT

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MOVE REVERSE LEVER TO THE NEUTRAL POSITION AND PLACE INDEPENDENT BRAKE CONTROL TO FULL APPLICATION.			ENGINEMAN'S DECISION TO PREVENT ANY INADVERTENT MOVEMENT OF THE LOCOMOTIVE.	OPERATE REVERSE LEVER, OPERATE INDEPENDENT BRAKE CONTROL LEVER.	REVERSE LEVER AND INDEPENDENT BRAKE CONTROL.	VISUAL OBSERVATION OF REVERSE LEVER AND INDEPENDENT BRAKE CONTROL IN PROPER POSITIONS.		ADDITIONAL SAFETY PRECAUTION TO PREVENT INADVERTENT MOVEMENT.
2.	POSITION CUT OFF VALVE TO APPROPRIATE POSITION AND GENERATOR FIELD SWITCH TO OFF.			KNOWLEDGE OF PERFORMANCE OF LEAKAGE TEST PER POWER BRAKE LAW OF 1958.	SET CUT OFF VALVE TO EITHER THE "FRGT" POSITION; GENERATOR FIELD SWITCH, OFF.	CUT OFF VALVE. GENERATOR FIELD SWITCH.	VISUAL OBSERVATION. VISUAL OBSERVATION.		
3.	ADVANCE THROTTLE AS REQUIRED, IF TRAIN NEEDS ADDITIONAL CHARGING.	ENGINE SPEED.		ENGINEMAN DECIDES TO INCREASE AIR FLOW BY INCREASING THE DIESEL ENGINE RPM. MAY NOT BE REQUIRED FOR CERTAIN MULTIPLE CONSISTS.	MOVE THROTTLE LEVER, THROTTLE.		INCREASE OF MAIN RESERVOIR PRESSURE. AT 140 PSI., STOP CHARGING.		IF ENGINE IS LEFT AT IDLE, THE PUMP UP TIME IS LONGER. THROTTLE POSITION NOT TO EXCEED NO. 5
3.1	NOTE THAT B.P. PRESSURES OF LOCOMOTIVE AND CABOOSE ARE AT THE REQUIRED VALUES.	COMMUNICATION FROM CABOOSE PERSONNEL.	AIR GAUGES.				B.P. PRESSURE AT CABOOSE IS 15 PSI. BELOW LOCOMOTIVE B.P. PRESSURE.	REAR END CREW MAN INDICATES CABOOSE GAUGE READING TO TO HEAD END.	

* STEP NO. 3 DURATION IS DEPENDENT UPON AMOUNT OF AIR REDUCTION REQUIRED, LENGTH OF TRAIN, ETC.

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 5

TASK NO.	B. 6	DIFFICULTY	3
TASK TITLE	FORMING THE CONSIST	HAZARD	B. C
SUB-TASK NO.	B. 6.3	CRITICALITY	4
SUB-TASK TITLE	BRAKE PIPE LEAK TEST	DURATION	5 TO 7 MINUTES
		FREQUENCY	PRIOR TO TRAIN MOVEMENT

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
4.	ADJUST THE AUTOMATIC BRAKE HANDLE FOR A 15 PSI REDUCTION.	SIGNAL FROM CABDOOSE CALLING FOR BRAKE TEST.	RADIO/TELEPHONE.	KNOWLEDGE OF BRAKE APPLICATION TIMES AND PRESSURES DEPENDENT UPON TRAIN LENGTH.	MOVE THE AUTOMATIC BRAKE HANDLE GRADUALLY INTO THE SERVICE POSITION, MAKING A 15 PSI REDUCTION.	AUTOMATIC BRAKE HANDLE. COMMUNICATION SYSTEM TO CABDOOSE.	OBSERVATION THAT THE EQUALIZING RESERVOIR GAUGE AND BRAKE PIPE GAUGE SHOW THE PROPER AMOUNT OF REDUCTION IN PRESSURE.	COMMUNICATION FROM BRAKEMAN.	VERIFICATION IS NEEDED THAT THE BRAKE PIPE IS OPERATING EFFECTIVELY FOR THE ENTIRE TRAIN AND THAT THE BRAKE PIPE IS OPEN THROUGHOUT THE ENTIRE TRAIN LENGTH.
5.	PLACE CUT OFF VALVE IN THE CUT OUT POSITION.	BRAKE PIPE PRESSURE REDUCED BY 15 PSI AND THE EXHAUST HAS STOPPED BLOWING.	BRAKE PIPE PRESSURE GAUGE.	ENGINEMAN MUST HAVE KNOWLEDGE OF BRAKE PIPE LEAKAGE TEST PROCEDURES.	OPERATE CUT OFF VALVE.	CUT OFF VALVE.	BRAKE PIPE GAUGE MAY CONTINUE TO DROP		

ENGINEMAN TASK ANALYSIS

SHEET 3 OF 5

TASK NO.	B. 6	DIFFICULTY	3
TASK TITLE	FORMING THE CONSIST	HAZARD	B, C
SUB-TASK NO.	B. 6.3	CRITICALITY	4
SUB-TASK TITLE	BRAKE PIPE LEAK TEST	DURATION	5 TO 7 MINUTES
		FREQUENCY	PRIOR TO TRAIN MOVEMENT

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
6.	MONITOR PRESSURE DROP IN BRAKE PIPE PRESSURE DURING A ONE MINUTE PERIOD.	BRAKE PIPE PRESSURE CHANGE NOTED FROM TIME CUT OFF VALVE PLACED TO CUT OUT POSITION.	CUT OFF VALVE.	DETERMINATION IF LEAKAGE RATE IS WITHIN RATE ALLOWED BY RAILROAD REGULATIONS. IF LEAKAGE EXCEEDS 5 PSI/MIN. THE TRAIN MAY NOT BE MOVED UNTIL LEAK IS REPAIRED.	OBSERVE GAUGE READING FOR 1 MINUTE TO DETERMINE LEAK RATE.	BRAKE PIPE GAUGE, WATCH.	ACTUAL LEAKAGE RATE COMPARED TO PERMISSIBLE RATE.		
7.	RETURN CUT OFF VALVE TO APPROPRIATE POSITION (SEE STEP 2).	LEAKAGE RATE IS WITHIN THE REQUIRED LIMIT (STEP 6).		ENGINEMAN HAS COMPLETED "BRAKE PIPE LEAKAGE TEST" AND WANTS TO RETURN TO NORMAL OPERATING CONDITION.	USING AUTOMATIC BRAKE HANDLE, LOWER THE EQUALIZING RESERVOIR PRESSURE TO THE VALUE OF THE BRAKE PIPE PRESSURE. THEN PLACE CUT OFF VALVE BACK TO "FRGT" POSITION.	CUT-OFF VALVE.	THE SOUND OF AIR PASSING THROUGH THE 26L AIR VALVE WILL BE HEARD FOR A SHORT PERIOD OF TIME.		ENABLING CUT OFF VALVE WHEN BRAKE PIPE PRESSURE AND EQUALIZING RESERVOIR PRESSURE ARE NOT THE SAME COULD (A) RELEASE THE TRAIN BRAKES OR (B) CAUSE AN UNINTENTIONAL EMERGENCY.

ENGINEMAN TASK ANALYSIS

SHEET 4 OF 5

TASK NO.	8	DIFFICULTY	3
TASK TITLE	FORMING THE CONSIST	HAZARD	B C
SUB-TASK NO.	B.6.3	CRITICALITY	4
SUB-TASK TITLE	BRAKE PIPE LEAKAGE TEST	DURATION	5 TO 7 MINUTES
		FREQUENCY	PRIOR TO TRAIN MOVEMENT

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
8	MAKE A FULL SERVICE BRAKE REDUCTION	VISUAL OBSERVATION OF GAUGES	EQUALIZING GAUGE AND BRAKE PIPE GAUGE	ENGINEMAN MUST KNOW HOW TO ACHIEVE A FULL SERVICE BRAKE REDUCTION.	MOVE THE AUTOMATIC BRAKE HANDLE GRAUALLY UNTIL A FULL SERVICE APPLICATION HAS BEEN ACHIEVED.	AUTOMATIC BRAKE VALVE HANDLE	EQUALIZING GAUGE PRESSURE = BRAKE PIPE PRESSURE.		THIS ACTION WILL ALLOW THE ENTIRE BRAKE PIPE TO REACH A NATURAL EQUILIBRIUM AND THEN PERMIT A NORMAL RECHARGING
9.	BE ADVISED THAT ALL BRAKES ARE FULLY APPLIED.				RECEIVE REPORT OF VISUAL INSPECTION OF BRAKE SHOES AND PISTON TRAVEL FROM YARD PERSONNEL.	RADIO OR VERBAL COMMUNICATIONS.	COMMUNICATION THAT ALL BRAKES HAVE BEEN EXAMINED.	CREW OR YARD PERSONNEL	
10.	RETURN AUTOMATIC BRAKE HANDLE TO RELEASE POSITION.			KNOWLEDGE OF AUTOMATIC BRAKE HANDLE OPERATION.	MOVE AUTOMATIC BRAKE HANDLE TO FULL RELEASE POSITION	AUTOMATIC BRAKE VALVE HANDLE	AURAL SOUND OF AIR BRAKE RELEASE. OBSERVATION OF BRAKE FLOW METER AND AIR GAUGES M.R. AND B.P. RESTORED TO NORMAL SETTINGS		THE ENGINEMAN MUST BE ABLE TO HANDLE TRAIN IF IT BEGINS TO ROLL DUE TO GRADE

ENGINEMAN TASK ANALYSIS

SHEET 5 OF 5

TASK NO.	B.6	DIFFICULTY	3
TASK TITLE	FORMING THE CONSIST	HAZARD	B. C
SUB-TASK NO.	B.8.3	CRITICALITY	4
SUB-TASK TITLE	BRAKE PIPE LEAKAGE TEST	DURATION	5 TO 7 MINUTES
		FREQUENCY	PRIOR TO TRAIN MOVEMENT

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
11.	BE INFORMED THAT ALL BRAKES ARE FULLY RELEASED. NOTE THAT THE ABOVE STEPS APPLY TO A TRAIN WHICH IS CHARGED BY THE LOCOMOTIVE. THE FOLLOWING STEPS APPLY TO A TRAIN WHICH HAS BEEN PRE-CHARGED WITH YARD AIR. TRAIN INSPECTED, BRAKES PRE-TESTED AND CARS REMAIN CHARGED.			DO NOT ATTEMPT MOVEMENT UNTIL ALL BRAKES ARE RELEASED.	RECEIVE REPORT OF VISUAL INSPECTION OF BOOSE SHOES AND PISTON TRAVEL FROM YARD PERSONNEL WHO HAVE WALKED LENGTH OF TRAIN.	RADIO, VERBAL COMMUNICATIONS, OR WRITTEN REPORT.	COMMUNICATION THAT ALL BRAKES HAVE BEEN CHECKED.	CREW OR YARD PERSONNEL	UNRELEASED BRAKES CAUSE SLIDING WHEELS WHICH RESULTS IN DAMAGE AND SOMETIMES ACCIDENTS.
12.	REPEAT STEP 8.	SEE ABOVE.							FOR THE PRE-CHARGED TRAIN, ONLY THE LEAKAGE TEST AND AN APPLICATION AND RELEASE TEST OF BRAKES ON REAR END CAR ARE REQUIRED.
13.	BE ADVISED THAT CABOOSE BRAKES ARE APPLIED.				RECEIVE REPORT THAT CABOOSE BRAKES APPLIED.		COMMUNICATION FROM CREW MEMBER.	REAR END CREW MEMBER.	
14.	REPEAT STEP 10.	SEE ABOVE.							
15.	BE ADVISED THAT CABOOSE BRAKES ARE RELEASED.				RECEIVE REPORT THAT CABOOSE BRAKES RELEASED.		COMMUNICATION FROM CREW MEMBER.	REAR END CREW MEMBER.	

ENGINEMAN TASK ANALYSIS

TASK NO.	C. 1	DIFFICULTY	1
TASK TITLE	OBTAINING CLEARANCE TO PROCEED	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	30 SECONDS
		FREQUENCY	PRIOR TO STARTING TRAIN

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OBTAIN PROPER DOCUMENTS WHICH GOVERN TRAIN MOVEMENT; COMMUNICATE WITH OPERATOR OR DISPATCHER.	ORDERS HAVE BEEN PROPERLY DELIVERED AND UNDERSTOOD.		KNOWLEDGE THAT CLEARANCE IS REQUIRED PRIOR TO MOVEMENT. DECISION THAT TRAIN IS READY TO MOVE. KNOWLEDGE OF TRAIN OPERATING RULES AND REGULATIONS. (e.g. TRAIN SUPERIORITY AND AUTHORITY)	OBTAIN DOCUMENTS FROM AUTHORIZED PERSONNEL; COMMUNICATE WITH OPERATOR OR DISPATCHER.	RADIO/TELEPHONE OR EXTERNAL SIGNALS OR TELEPHONE.	RECEIVES CLEARANCE.	COMMUNICATION WITH YARD-MASTER, DISPATCHER, ETC., MAY BE DONE BY A CREW MEMBER.	GOVERNED BY OPERATING RULES AND REGULATIONS. TRAIN MOVEMENT IS AUTHORIZED BY (1) TRAIN ORDERS (2) SIGNALS (3) TIME TABLES.

ENGINEMAN TASK ANALYSIS

TASK NO.	C. 2	DIFFICULTY	1
TASK TITLE	STARTING THE TRAIN	HAZARD	-
SUB-TASK NO.	C. 2. 1	CRITICALITY	2
SUB-TASK TITLE	INITIAL CONTROL POSITIONS	DURATION	30 SECONDS
		FREQUENCY	WHEN REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	PLACE THE SELECTOR LEVER TO THE NO. 1 POSITION.				OPERATE SELECTOR LEVER.	SELECTOR LEVER INDICATOR WINDOW.	OBSERVE "1" ON THE INDICATOR		NECESSARY FOR TRAIN MOTION.
2.	MOVE THE REVERSE LEVER TO THE DESIRED DIRECTION.			DETERMINE DESIRED DIRECTION OF MOVEMENT, FORWARD OR REVERSE.	OPERATE REVERSE LEVER.	REVERSE LEVER INDICATOR WINDOW.	OBSERVE "FWD" OR "REV" IN WINDOW		NECESSARY FOR TRAIN MOTION.
3.	PLACE ENGINE RUN AND GENERATOR FIELD SWITCH TO ON.				OPERATE SWITCHES.	ENGINE RUN AND GENERATOR FIELD.	VISUAL OBSERVATION.		NECESSARY FOR TRAIN MOTION.

ENGINEMAN TASK ANALYSIS

TASK NO.	C. 2	DIFFICULTY	3
TASK TITLE	STARTING THE TRAIN	HAZARD	B. C. E
SUB-TASK NO.	C. 2. 2	CRITICALITY	4
SUB-TASK TITLE	RELEASING AIR BRAKES	DURATION	DEPENDENT ON TRAIN LENGTH
		FREQUENCY	AS REQUIRED.

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RELEASE AIR BRAKES ON TRAIN AND LOCOMOTIVE.	TRAIN IS READY TO MOVE. AIR BRAKES ARE PRESENTLY APPLIED.	AUTOMATIC AND INDEPENDENT BRAKES ARE IN "RUNNING" POSITION.	BASED ON TRAIN CONFIGURATION AND TRACK CONDITIONS, KNOWLEDGE OF HOW THE TRAIN WILL PERFORM WHEN THE BRAKES ARE RELEASED.	PLACE INDEPENDENT BRAKE CONTROL LEVER TO RELEASE POSITION.	INDEPENDENT BRAKE VALVE.	AIR FLOW SOUND IS HEARD. BRAKE CYLINDER PRESSURE GAUGE DROPS TO ZERO; TRAIN MAY START TO MOVE. BRAKE FLOW METER DEFLECTS.		
					PLACE AUTOMATIC BRAKE CONTROL LEVER TO RELEASE POSITION.	AUTOMATIC BRAKE VALVE.	AIR FLOW SOUND IS HEARD. MAIN RESERVOIR WILL DROP. AIR COMPRESSOR WILL CUT IN. BRAKEMAN WILL ADVISE OF RELEASE OF CABOOSE BRAKES. BRAKE FLOW METER DEFLECTS.	COMMUNICATION WITH BRAKEMAN IN CABOOSE.	
1.1	OPERATE COMMUNICATING AND OR WARNING DEVICES PRIOR TO MOVING.			NECESSARY TO ADVISE PERSONNEL OF MOVEMENT.	OPERATE TRAIN BELL. OPERATE AIR HORN.	TRAIN BELL AIR HORN.	AURAL SOUND OF BELL. AURAL SOUND OF HORN.		WHEN MOVING FORWARD. WHEN MOVING BACKING.

ENGINEMAN TASK ANALYSIS

TASK NO.	C. 2	DIFFICULTY	5*
TASK TITLE	STARTING THE TRAIN	HAZARD	B, C, E
SUB-TASK NO.	C. 2.3	CRITICALITY	5*
SUB-TASK TITLE	START MOVEMENT	DURATION	2 TO 8 MINUTES
		FREQUENCY	EVERYTIME TRAIN IS MOVED FROM STOP.

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	APPLY POWER TO START TO MOVE TRAIN.	TRAIN IS READY TO MOVE, CLEARANCE HAS BEEN RECEIVED, OR A PROPER SIGNAL HAS BEEN RECEIVED.	ALL SWITCHES, VALVES, AND CONTROLS IN OPERATING MODE.	PROPER UNDERSTANDING OF RULES AND SIGNALS. ENGINEMAN MUST KNOW GRADE OF TRACK, SLACK CONDITION OF TRAIN AND LOAD.	PLACE THE THROTTLE TO POSITION 1, 2, 3 OR 4 TO START, THEN COME BACK TO LOWER SETTING. WATCH LOAD CURRENT AMMETER.	THROTTLE AND LOAD CURRENT METER.	ENGINE RPM WILL PICK UP. LOCOMOTIVE WILL START TO MOVE. "BUMPS" WILL BE FELT AS FIRST CARS ARE PICKED UP.		CONTROL OF SLACK ACTION IS VERY IMPORTANT TO PREVENT DAMAGE TO COUPLERS AND CARGO.
2.	APPLY SAND TO ALL TRUCKS.	GRADE CONDITIONS AND/OR TRAIN SLACK REQUIRES THE USE OF SAND.		DETERMINATION THAT SAND IS NECESSARY AND ALL TRUCKS MUST BE SANDED.	PLACE SAND ALL TRUCKS CONTROL LEVER TO EITHER FORWARD OR BACKWARD POSITION, DEPENDENT UPON DIRECTION OF TRAVEL.	SAND ALL TRUCKS CONTROL LEVER.	SAND LIGHT ON LOCOMOTIVE CONTROL STAND WILL ILLUMINATE. AURAL SANDING SOUND WILL BE NOTICED.		SEVERE SLACK ACTION WILL RESULT IF LOCOMOTIVE WHEELS SLIP (REFERENCE TASK A.8)

* INITIAL MOVEMENT OF TRAIN IS ONE OF THE MOST DIFFICULT AND CRITICAL TASKS THAT AN ENGINEMAN PERFORMS!

ENGINEMAN TASK ANALYSIS

TASK NO.	C.2	DIFFICULTY	2
TASK TITLE	STARTING THE TRAIN	HAZARD	-
SUB-TASK NO.	C.2.4	CRITICALITY	4
SUB-TASK TITLE	OBSERVATION OF LOAD CURRENT	DURATION	1 SECOND TO CHANGE THROTTLE POSITION
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OBSERVATION OF LOAD CURRENT AMMETER.	LOAD CURRENT INDICATES HOW MUCH POWER IS BEING DEVELOPED.	LOAD CURRENT AMMETER.	MAKE DECISION: (1) LEAVE THROTTLE ALONE. (2) ADVANCE THROTTLE. (3) REDUCE THROTTLE. TOO MUCH POWER MAY RESULT IN WHEEL SLIP, RAIL BURN, TRACTION MOTOR DAMAGE, AND/OR SEVERE SLACK ACTION. (REFERENCE TASKS A.1 AND A.2)	MOVE THROTTLE TO NEW POSITION IF REQUIRED	THROTTLE, AMMETER.	SOUND OF DIESEL ENGINE RPM CHANGES IN RESPONSE TO THROTTLE CHANGES. LOAD CURRENT WILL MAKE RAPID CHANGE TO NEW VALUE IF SPEED IS CHANGED		

ENGINEMAN TASK ANALYSIS

TASK NO.	C. 2	DIFFICULTY	3
TASK TITLE	STARTING THE TRAIN	HAZARD	-
SUB-TASK NO.	C. 2. 5	CRITICALITY	4
SUB-TASK TITLE	TRAIN VELOCITY DETERMINATION AT SLOW SPEEDS	DURATION	1/2 TO 5 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OBSERVATION OF GROUND OR OTHER FIXED LAND MARKS (e.g. TELEPHONE POLES) TO JUDGE TRAIN VELOCITY AT SLOW SPEED.	VISUAL OBSERVATION AND AURAL SOUNDS OF ENGINE LOADING.	SPEEDOMETER, LOAD METER.	DETERMINATION IF TRAIN IS MOVING TOO FAST OR TOO SLOW.	READJUST THROTTLE TO MODIFY SPEED.	THROTTLE	VELOCITY CHANGES TO NEW VALUE.		INITIAL VELOCITY MUST BE CONTROLLED TO PREVENT SEVERE SLACK ACTION WITH CONSEQUENT EQUIPMENT DAMAGE OR PERSONNEL INJURIES.

ENGINEMAN TASK ANALYSIS

TASK NO.	C. 2	DIFFICULTY	1
TASK TITLE	STARTING THE TRAIN	HAZARD	-
SUB-TASK NO.	C. 2. 8	CRITICALITY	4
SUB-TASK TITLE	CONFIRMATION OF CABOOSE MOVEMENT	DURATION	1/2 TO 2 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CONFIRM THAT CABOOSE IS MOVING.	ENGINEMAN IS ADVISED THAT CABOOSE IS MOVING AND SLACK IS PROPERLY ADJUSTED.	RADIO/TELEPHONE	ENGINEMAN MUST DETERMINE WHEN TO APPLY MORE POWER TO ACCELERATE THE TRAIN.	START TO APPLY MORE POWER IF DESIRED, PROPERLY CONTROLLING SLACK.	THROTTLE	VELOCITY CHANGE	COMMUNICATE WITH PERSONNEL IN CABOOSE.	APPLYING TOO MUCH POWER TOO SOON WILL RESULT IN A POSSIBLE BREAK-IN-TWO DUE TO EXCESSIVE SLACK ACTION

ENGINEMAN TASK ANALYSIS

TASK NO.	C. 2	DIFFICULTY	•
TASK TITLE	STARTING THE TRAIN	HAZARD	•
SUB-TASK NO.	C. 2. 1	CRITICALITY	•
SUB-TASK TITLE	OPERATION OF AUXILIARY EQUIPMENT	DURATION	•
		FREQUENCY	•

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
	REFER TO TASK GROUPING G FOR DESCRIPTION OF OPERATION OF AUXILIARY EQUIPMENT REQUIRED DURING TRAIN STARTING PROCEDURES.								

* REFER TO TASK GROUPING G TO OBTAIN RATINGS, ETC. FOR AUXILIARY EQUIPMENT OPERATION.

ENGINEMAN TASK ANALYSIS

TASK NO.	C. 2	DIFFICULTY	4
TASK TITLE	STARTING THE TRAIN	HAZARD	B, C, E
SUB-TASK NO.	C. 2. 8	CRITICALITY	4
SUB-TASK TITLE	UNDER SPECIAL SITUATIONS	DURATION	DEPENDS UPON LENGTH OF GRADE
	(a) DESCENDING GRADE	FREQUENCY	ON DESCENDING GRADES

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	REFER TO SUB-TASK C. 2. 1 THROUGH C. 2. 8.	STEEPNESS OF GRADE AND CURVATURE ARE IMPORTANT INPUTS. KNOWLEDGE OF TRAIN CONFIGURATION. (e.g. LOCATION OF SLACK).							
2.	DEPENDENT UPON STEEPNESS OF DOWN-GRADE, USE INDEPENDENT BRAKE OR DYNAMIC BRAKE TO CONTROL SPEED OF HEAD END.		TRACK CHARTS. TRAIN HANOLING INDICATOR (IF AVAILABLE).	BASED UPON INPUTS, DECIDE WHICH BRAKING MODE IS SUFFICIENT.	BEFORE TRAIN SPEED BECOMES TOO HIGH, DETERMINE THAT SELECTED BRAKING MODE IS ADEQUATE TO MAINTAIN SPEED ON DOWN-GRADE.	SPEEDOMETER, BRAKING CONTROLS (e.g. INDEPENDENT BRAKE AND DYNAMIC BRAKE CONTROLS)	MAINTAINING OF TRAIN SPEED IS NOTED.		

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 3

TASK NO.	C. 2	DIFFICULTY	5
TASK TITLE	STARTING THE TRAIN	HAZARD	B. C. E
SUB-TASK NO.	C. 2. 8	CRITICALITY	4
SUB-TASK TITLE	UNDER SPECIAL SITUATIONS (b) ASCENDING GRADE	DURATION	DEPENOS UPON LENGTH OF TRAIN AND GRADE
		FREQUENCY	ON ASCENDING GRADES

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ESTABLISH CONTACT WITH REAR END PRIOR TO ATTEMPTING TO BUNCH SLACK.	KNOWLEDGE OF GRADE, CURVATURE, SLACK CONDITIONS, RADIO CONTACT.	RADIO	RADIO CONTACT ESTABLISHED AND SLACK MUST BE BUNCHED BEFORE STARTING THE TRAIN.	ADVISE CREW MEMBER OF INTENTIONS PRIOR BACKING INTO TRAIN TO BUNCH SLACK.	RADIO	CONFIRM INFORMATION TRANSFER.	ACKNOWLEDGE INFORMATION RECEIPT.	
2.	SET HAND BRAKES ON REAR PORTION OF TRAIN, IF REQUIRED.			DECISION THAT IT IS REQUIRED TO PREVENT REAR END FROM MOVING AS SLACK IS BEING BUNCHED.	ADVISE REAR END TO SET HAND BRAKES ON CARS.	RADIO, HAND BRAKES	CONFIRMATION FROM REAR END CREW MEMBERS.	COMMUNICATION WITH TRAIN CREW.	
3.	MAKE BRAKE PIPE REDUCTION SUFFICIENT TO HOLD TRAIN.	HAND BRAKES SET.			MAKE REQUIRED REDUCTION WITH AUTOMATIC BRAKE HANDLE.	AUTOMATIC BRAKE HANDLE.	AURAL SOUNDS AND VISUAL OBSERVATION OF PRESSURE GAUGES.		
4.	BACK INTO TRAIN	TRAIN STRETCHED, NEEDS TO BE BUNCHED.		DECISION TO SLOWLY BACK LOCOMOTIVE INTO THE TRAIN.	PLACE THE REVERSE LEVER TO REVERSE. MOVE THROTTLE TO RUN 1, THEN BACK TO IDLE.	REVERSE, THROTTLE.	PHYSICAL SENSATION THAT LOCOMOTIVE IS SLOWLY MOVING.		
5.	CONTINUE BUNCHING THE SLACK BY ROLLING BACKWARD OF THE HEAD PORTION OF TRAIN.	REAR END OF TRAIN STATIONARY, HEAD END MOVING.	RADIO	SLACK IS CONTINUING TO BUNCH. IS ADDITIONAL REDUCTION REQUIRED TO KEEP HEAD END ROLLING IN?	MOVE BRAKE HANDLE TO OBTAIN FURTHER REDUCTION, IF REQUIRED.	AUTOMATIC BRAKE HANDLE.	PHYSICAL SENSATION THAT TRAIN IS STOPPED, FULLY BUNCHED. COMMUNICATION FROM REAR END.	REAR END CREW MEMBER.	
6.	READY TO MOVE FORWARD, UP ASCENDING GRADE.				PLACE REVERSE LEVER TO FORWARD.	REVERSE.	OBSERVE WINDOW INDICATOR FOR REVERSE.		

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 3

TASK NO.	C.2	DIFFICULTY	5
TASK TITLE	STARTING THE TRAIN	HAZARD	B. C. E
SUB-TASK NO.	C.2.9	CRITICALITY	4
SUB-TASK TITLE	UNDER SPECIAL SITUATIONS (b) ASCENDING GRADE	DURATION	DEPENDS UPON LENGTH OF TRAIN AND GRADE
		FREQUENCY	ON ASCENDING GRADES

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
7.	RELEASE HAND BRAKES. IF SET.	TRAIN MOVING PROPERLY.		WERE HAND BRAKES SET?	ADVISE CREW TO RELEASE HAND BRAKES.	RADIO	CONFIRMATION FROM REAR END CREW	REAR END CREW	
8.	RELEASE BRAKES. ADVANCE THROTTLE SLOWLY TO MOVE TRAIN.	CORRECT DIRECTION OF MOVEMENT SELECTED. (FORWARD)		POWER WILL BE APPLIED TO TRAIN WHILE BRAKES ON THE REAR END ARE RELEASING.	PLACE AUTOMATIC BRAKE HANDLE. RELEASE. ADVANCE THROTTLE TO DESIRED POSITION.	AUTOMATIC BRAKE HANDLE. THROTTLE HANDLE.	TRAIN BEGINS TO MOVE WITHOUT JERKY MOTION OR LURCHING.		REFER TO TASK A.1 FOR PROPER ACCELERATION TECHNIQUES
I	VARIATION OF TECHNIQUE.								
	BUNCHING OPERATION USING CABOOSE BRAKE VALVE. IF TRAIN SO EQUIPPED.	CABOOSE BRAKE VALVE AVAILABLE.	RADIO CONTACT WITH CABOOSE.	DECISION THAT REAR END OF TRAIN WILL BE HELD STATIONARY BY CABOOSE VALVE OPERATION AS TRAIN IS BUNCHED ON THE GRADE	PERFORM CERTAIN STEPS AS INDICATED BY THIS SUB-TASK. EXCEPT USE CABOOSE VALVE TO STOP REAR END FROM MOVING	RADIO. CABOOSE VALVE.	REAR END OF TRAIN IS ADEQUATELY CONTROLLED BY OPERATION OF CABOOSE VALVE.	REAR END CREW.	RELEASE CABOOSE BRAKES AT APPROPRIATE TIME AFTER BUNCHING OPERATION AND TRAIN IS BEGINNING THE GRADE ASCENT

ENGINEMAN TASK ANALYSIS

TASK NO.
TASK TITLE
SUB-TASK NO.
SUB-TASK TITLE

C. 2
STARTING THE TRAIN
C. 2. 9.
UNDER SPECIAL SITUATIONS
(b) ASCENDING GRADE

DIFFICULTY
HAZARD
CRITICALITY
DURATION
FREQUENCY

5
B, C, E
4
DEPENDS UPON TRAIN AND GRADE
ON ASCENDING GRADE

SHEET 3 OF 3

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
II	BUNCHING OPERATION, WITHOUT ASSISTANCE FROM CABOOSE.	NO COMMUNICATION WITH CABOOSE.		NEED TO BUNCH SLACK, BUT NO CONTACT WITH REAR END OF TRAIN.	(1) MAKE BRAKE PIPE REDUCTION SUFFICIENT TO HOLD TRAIN. (2) BACK INTO TRAIN UNTIL REAR END MOVES. (3) CONTINUE SERVICE REDUCTION UNTIL TRAIN STOPS. (4) APPLY INDEPENDENT FULLY AND MAKE A FURTHER 10psi REDUCTION (5) CLOSE THROTTLE (6) POSITION REVERSER TO FORWARD. (7) RELEASE BRAKES, OPEN THROTTLE AND MOVE SLOWLY, USING INDEPENDENT TO CONTROL LOW SPEED MOVEMENT.	AUTOMATIC BRAKE HANDLE. REVERSER LEVER, THROTTLE. AUTOMATIC BRAKE HANDLE. INDEPENDENT BRAKE HANDLE, AUTOMATIC BRAKE HANDLE. THROTTLE. REVERSER LEVER. AIR BRAKE CONTROLS AND THROTTLE.	PHYSICAL SENSATIONS BASED UPON PREVIOUS EXPERIENCE THAT TRAIN HAS PROPERLY BUNCHED AND THAT CABOOSE HAS STOPPED MOVING. TRAIN MOVES SLOWLY FORWARD WITHOUT EXCESSIVE SLACK ACTION.	INTERACTION WITH REAR END CREW MEMBERS IS NOT AVAILABLE.	THE RECOMMENDED APPROACH FOR BUNCHING SLACK ON ASCENDING GRADE INVOLVES COMMUNICATION WITH REAR END.

ENGINEMAN TASK ANALYSIS

C. 3

TASK NO.
TASK TITLE
SUB-TASK NO.
SUB-TASK TITLE

MOVING TO MAIN TRACK

DIFFICULTY
HAZARD
CRITICALITY
DURATION
FREQUENCY

3
B
2
DEPENDENT UPON LOCATION
PRIOR TO ENTERING MAIN LINE

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MOVE TRAIN FROM YARD TO ENTRANCE TO MAIN LINE, OBSERVING THAT ALL SWITCHES, BOTH MANUAL AND AUTOMATIC, ARE PROPERLY ALIGNED.	DIRECTION AND SPEED OF MOVEMENT. VISUAL OBSERVATION OF SWITCHES.	SIGNAL LIGHTS, FLAGS, HAND OR VERBAL COMMANDS. SWITCHES.	KNOWLEDGE OF SIGNAL LIGHTS, FLAG SIGNALS, OR OTHER CONTROL SIGNALS FOR YARD MOVEMENT. UNDERSTANDING OF RULES AND REGULATIONS FOR YARD MOVEMENTS. (e.g. YARD SPEED LIMITS).	CONTROL TRAIN ACCORDING TO SAFE OPERATING PROCEDURES AND SIGNAL COMMANDS. HAVE MANUAL SWITCHES THROWN, IF REQUIRED	THROTTLE, BRAKES, TRAIN WHISTLE AND BELL. SWITCHES		COMMUNICATION WITH YARD PERSONNEL. COMMUNICATE WITH BRAKE MAN, SWITCHMAN, OR OTHER YARD PERSONNEL.	STOP PRIOR TO ENTERING MAIN LINE AND OBTAIN PROPER CLEARANCE.
2.	MOVE TRAIN ONTO MAIN LINE.	CLEARANCE RECEIVED.		VISUALLY DETERMINE THAT MAIN LINE IS CLEAR.	OPERATE TRAIN CONTROLS IN THE PRESCRIBED MANNER.	REQUIRED TRAIN CONTROLS.		COMMUNICATION WITH DISPATCHER.	CLEARANCE DOES NOT INSURE THAT MAIN LINE IS CLEAR; VISUALLY CHECK.

ENGINEMAN TASK ANALYSIS

TASK NO.	0.1	DIFFICULTY	3
TASK TITLE	SPEED AND SLACK CONTROL	HAZARD	-
SUB-TASK NO.	0.1.1	CRITICALITY	2
SUB-TASK TITLE	KNOWLEDGE OF TRAIN CONSIST AND TERRITORY	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	TO SATISFACTORILY PERFORM SPEED AND SLACK CONTROL, THE ENGINEMAN MUST HAVE DETAILED KNOWLEDGE OF THE TRAIN CONSIST AND RAILROAD TERRITORY.	TRAIN MAKE-UP (e.g. NO. AND LOCATION OF FULLS AND EMPTIES). TRACK PROFILE (e.g. GRADE, CURVATURE, MILEPOST SPEED LIMITS).	TRACK CHARTS. TRAIN ORDERS. MILE POSTS, SIGNAL LIGHTS, SPEED LIMIT SIGNS, ETC.	ENGINEMAN MUST BE ABLE TO DETERMINE "TONS PER OPERATIVE BRAKE" WHICH IS AN INDICATOR OF THE TRAIN STOPPING CHARACTERISTICS. BASED ON EXPERIENCE, ANTICIPATE NEXT ACTION PRIOR TO ITS PERFORMANCE, BASED ON KNOWLEDGE OF TRAIN AND ROAD.	CALCULATION REGARDING MAKE-UP OF CONSIST. RECALL FROM MEMORY.	MEMORIZED FACTS AND INFORMATION CONCERNING TRAIN AND TRACK CONFIGURATIONS.	FROM THE TONS-PER-OPERATIVE-BRAKE RATIO, SAFE DOWNHILL SPEEDS CAN BE DETERMINED.	COMMUNICATION WITH DISPATCHER.	DIFFERENT TRAINS MAY REQUIRE DIFFERENT HANDLING TECHNIQUES. DAMAGE AND INJURY COULD RESULT IF IMPROPERLY HANDLED.

ENGINEMAN TASK ANALYSIS

TASK NO.	0.1	DIFFICULTY	5
TASK TITLE	SPEED AND SLACK CONTROL	HAZARD	B, C, E
SUB-TASK NO.	0.1.2	CRITICALITY	4
SUB-TASK TITLE	AUTOMATIC BRAKING	DURATION	15 TO 40 SECONDS, DEPENDENT UPON TRAIN LENGTH
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MAKE A MINIMUM BRAKE APPLICATION TO ADJUST SLACK.	RESTRICTIVE AREA, APPROACHING DOWN GRADE, OR A SCHEDULED STOP.	SIGNAL LIGHT, FLAG OR OTHER SIGNAL DEVICE.	ENGINEMAN HAS DECIDED THAT AIR BRAKES ARE REQUIRED AND A MINIMUM REDUCTION IS THE FIRST STEP.	PLACE AUTOMATIC BRAKE VALVE INTO MINIMUM SERVICE POSITION.	AUTOMATIC BRAKE CONTROL	SOUND OF AIR RELEASING IS HEARD. EQUALIZING AND BRAKE PIPE GAUGES DECREASE 8-8 psi. BRAKE CYLINDER COMES UP TO APPROXIMATELY 10psi.		A MINIMUM REDUCTION WILL PERMIT THE TRAIN TO ADJUST THE SLACK UNIFORMLY. PRIOR TO ANY MORE REDUCTIONS. (REFERENCE TASK A.3)
2.	MAKE ADDITIONAL REDUCTIONS, IF REQUIRED.	TRAIN NOT SLOWING AT DESIRED RATE TO REACH SPEED REDUCTION WITHIN REQUIRED DISTANCE.	SPEEDOMETER	DECISION IF ADDITIONAL BRAKING IS REQUIRED TO SLOW DOWN THE TRAIN. USE OF SPLIT REDUCTION TECHNIQUES.	PLACE AUTOMATIC BRAKE HANDLE TO REQUIRED SERVICE POSITION.	AUTOMATIC BRAKE HANDLE.	AURAL SOUNDS AND VISUAL OBSERVATION OF GAUGES AND SPEEDOMETER.		

ENGINEER TASK ANALYSIS

TASK NO.	D.1	DIFFICULTY	3
TASK TITLE	SPEED AND SLACK CONTROL	HAZARD	-
SUB-TASK NO.	D.1.3	CRITICALITY	3
SUB-TASK TITLE	DYNAMIC BRAKE MODE	DURATION	10 SECONDS TO ONE MINUTE
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CHANGE FROM POWER TO DYNAMIC BRAKE MODE TO GATHER SLACK SMOOTHLY.	APPROACH TO DOWN-HILL GRADE, OR SLOWING REQUIRED IN PREPARATION FOR STOP.		ENGINEER MUST DECIDE THAT THE DYNAMIC BRAKE, MODE IS REQUIRED.	(1) PLACE THROTTLE TO IDLE (2) WAIT 10 SECONDS (3) PLACE SELECTOR LEVER IN "B" POSITION. (4) OBSERVE LOAD CURRENT AMMETER. (5) USING LOW VALUES OF DYNAMIC BRAKE, BUNCH SLACK.	THROTTLE, SELECTOR LEVER, AMMETER.	SOUND OF ENGINE RPM DECREASE IS HEARD; THEN INCREASE IS NOTED WHEN DYNAMIC BRAKE BECOMES EFFECTIVE.		IF SELECTOR LEVER IS PLACED INTO "B" POSITION TOO FAST THE HIGH RESIDUAL CURRENT WILL CAUSE THE TRAIN TO RUN IN TOO FAST. (REFERENCE TASK A.6)

ENGINEMAN TASK ANALYSIS

TASK NO.	D.1	DIFFICULTY	3
TASK TITLE	SPEED AND SLACK CONTROL	HAZARD	B. E
SUB-TASK NO.	0.1.4	CRITICALITY	3
SUB-TASK TITLE	POWER REAPPLICATION	DURATION	10 TO 60 SECONDS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CHANGE FROM DYNAMIC BRAKE, TO POWER WITHOUT SEVERE SLACK ACTION.	A DOWNHILL GRADE SECTION HAS BEEN COMPLETED AND POWER IS NOW NECESSARY TO MAINTAIN THE SCHEDULE.		ENGINEMAN MUST DECIDE THAT THE POWER OR TRACTIVE EFFORT MODE IS REQUIRED.	(1) PLACE THROTTLE IN IDLE. (2) MOVE SELECTOR LEVER TO "OFF" POSITION. (3) WAIT 10 SECONDS AND THEN PLACE SELECTOR LEVER TO POSITION "1". (4) START SLOWLY, APPLYING POWER.	THROTTLE AND SELECTOR CONTROL LEVER.	ENGINE SOUND DROPS TO IDLE LEVEL THEN STARTS TO INCREASE AS POWER IS REAPPLIED.		APPLYING POWER TOO FAST WILL CAUSE SEVERE SLACK ACTION AND MAY RESULT IN A BREAK-IN-TWO CONDITION AND DERAILMENT.

ENGINEMAN TASK ANALYSIS

TASK NO.	D. 1	DIFFICULTY	5
TASK TITLE	SPEED AND SLACK CONTROL	HAZARD	B. C. E
SUB-TASK NO.	0.1.5	CRITICALITY	5
SUB-TASK TITLE	MAINTAIN SCHEDULE	DURATION	CONTINUOUS
		FREQUENCY	CONTINUOUS

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ENGINEMAN MUST BE ABLE TO MAINTAIN SPEED OF TRAIN AT A DESIRED VALUE TO: a) MEET SCHEDULE. b) MAINTAIN SPEED LIMIT RESTRICTIONS. c) MINIMIZE EQUIPMENT DAMAGE. d) INSURE SAFETY OF OPERATIONS.	SPEED, TIME, MILE-POST, TRAIN ORDERS, KNOWLEDGE OF ROAD.	SCHEDULES, TRAIN ORDERS SPEEDOMETER, WATCH.	ENGINEMAN MUST KNOW WHAT AVERAGE SPEED HE MUST MAINTAIN ALONG A PARTICULAR SECTION OF TRACK AND KNOW IF HE IS EARLY OR LATE.	IF EARLY, SLOW DOWN. IF LATE, SPEED UP TO GET BACK ON SCHEDULE (REFERENCE TASKS A.1 THRU A.6).		AT NEXT CALCULATION OR CHECK POINT THE EFFECT OF SLOWING DOWN OR SPEEDING UP WILL BE NOTED AND A NEW CORRECTION SPEED CAN BE DETERMINED.	COMMUNICATION WITH DISPATCHER.	EXCESS SPEED IS DANGEROUS TO LIFE AND EQUIPMENT. AT VERY LOW SPEEDS, IT IS DIFFICULT TO MAINTAIN UNIFORM CONTROL OVER THE TRAIN.

ENGINEMAN TASK ANALYSIS

TASK NO.	D. 1	DIFFICULTY	1
TASK TITLE	SPEED AND SLACK CONTROL	HAZARD	-
SUB-TASK NO.	0.1.6	CRITICALITY	2
SUB-TASK TITLE	RESPONSE TO SIGNAL ASPECTS	DURATION	5 - 10 SECONDS
		FREQUENCY	QUITE FREQUENTLY

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OBSERVATION OF EXTERNAL SIGNAL LIGHTS	SIGNAL ASPECT.	SIGNAL LIGHT.	KNOWLEDGE OF SIGNAL MEANING PER OPERATING RULES.	CONFIRM SIGNAL ASPECT BY CALLING OUT SIGNAL.		LISTEN TO HEAD END CREW MEMBER CALL BACK SIGNAL; CONFIRM THAT CALL OUT OF SIGNALS AGREE.	CONVERSATION WITH HEAD END CREWMAN (e.g. FIREMAN, BRAKEMAN).	
2.	TAKE NECESSARY ACTION IN COMPLIANCE WITH SIGNAL ASPECT. (e.g. CHANGE SPEED).	SIGNAL ASPECT.	SIGNAL LIGHT.	KNOWLEDGE OF SIGNAL MEANING PER OPERATING RULES.	OPERATE NECESSARY CONTROLS AS DESCRIBED BY TASK 0.1 TO CONTROL SPEED AND SLACK PROPERLY	REFER TO TASK 0.1 IF CONTROL OF SPEED IS INDICATED BY SIGNAL ASPECT			

ENGINEMAN TASK ANALYSIS

TASK NO.	0.1	DIFFICULTY	5
TASK TITLE	SPEED AND SLACK CONTROL	HAZARD	B, C, E
SUB-TASK NO.	0.1.7	CRITICALITY	5
SUB-TASK TITLE	UNOULATING TERRITORY OPERATION	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	TRAIN HANDLING IN MOUNTAINOUS TERRITORY (MINIMIZING SLACK ACTION).	KNOWLEDGE OF ROAD, SIGNAL ASPECTS, TEMPORARY ROAD RESTRICTIONS.	TRACK CHARTS, SIGNALS, TRAIN ORDERS, TEMPORARY MARKERS, ETC. TRAIN HANDLING INDICATOR (IF AVAILABLE).	ENGINEMAN MUST DECIDE WHAT TRAIN HANDLING TECHNIQUE TO USE ON A PARTICULAR SECTION OF TRACK FOR BEST RESULTS (GENERALLY, ATTEMPT TO MAINTAIN CONSTANT VELOCITY).	UTILIZE POWER, DYNAMIC BRAKES AND AIR BRAKES AS REQUIRED TO PREVENT UNNECESSARY SLACK ACTION.	THROTTLE, AIR BRAKES, DYNAMIC BRAKE.	LOAD CURRENT AMMETER INDICATIONS OR POWER DEVELOPED IN TRACTION AND RETARDING FORCE WHEN DYNAMIC BRAKE IS USED. MOTION CUES.		HARSH TRAIN ACTION COULD RESULT IN DAMAGE TO CARGO, BROKEN COUPLERS PERSONNEL INJURY AND AND TIME DELAYING BREAK-IN-TWOS. (REFERENCE TASK A.1 THRU A.6).

ENGINEERMAN TASK ANALYSIS

TASK NO.	D. 2	DIFFICULTY	4
TASK TITLE	MAINTENANCE REQUIREMENTS	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	3
SUB-TASK TITLE	---	DURATION	VARIABLE
		FREQUENCY	AS REQUIRED DURING RUN

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MONITOR EQUIPMENT OPERATING DURING TRIP, NOTING DEFECTS OR IMPROPER OPERATION.	REFER TO TASK GROUPING F FOR DETAILS OF MALFUNCTIONS, ETC.		WHEN DEFECTS ARE ENCOUNTERED DURING THE RUN, THE DECISION IS MADE CONCERNING CONSEQUENCES OF CONTINUED OPERATION.	(1) MINOR DEFECTS: MAKE NOTES FOR WORK REPORT TO BE COMPLETED AT END OF TRIP (2) MAJOR DEFECTS: ISOLATE AFFECTED UNITS, SET OUT DEFECTED UNITS, OR STOP. NOTIFY DISPATCHER OF ACTIONS.	CLIP BOARD, ETC.	MINOR EFFECT ON CONTINUED OPERATION MAJOR EFFECT ON CONTINUED OPERATION	DISPATCHER, CREW MEMBERS.	WHEN DEFECTS ARE NOTED IT IS EXTREMELY IMPORTANT TO OBTAIN AS MUCH DATA AS POSSIBLE TO EFFECTIVELY DESCRIBE THE CONDITION FOR MAINTENANCE PERSONNEL.

ENGINEMAN TASK ANALYSIS

TASK NO.	0.3	DIFFICULTY	2
TASK TITLE	APPROACHING CROSSINGS	HAZARD	8
SUB-TASK NO.		CRITICALITY	3
SUB-TASK TITLE		DURATION	15 - 30 SECONDS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MOVEMENT OF TRAIN SAFELY THROUGH THE RAILROAD CROSSING.	APPROACHING CROSSING.	MILEPOST OR VISUAL OBSERVATION.	KNOWLEDGE OF TRACK (i.e. LOCATION OF CROSSINGS) AND REGULATIONS RELATIVE TO NEGOTIATING CROSSINGS. VISUAL OBSERVATION. REDUCING SPEED BEFORE REACHING RAIL CROSSING ENSURES VOLTAGE DELAY PRIOR TO THE MECHANICAL SHOCK TRANSMITTED TO THE BRUSHES AT THE CROSSING.	REDUCE FOR PROPER SPEED THROUGH CROSSING	THROTTLE, SPEEDOMETER			
2.	MOVEMENT OF TRAIN SAFELY THROUGH THE HIGHWAY CROSSING.	APPROACHING CROSSING.	CROSSING SIGNPOST.		OPERATE TRAIN WHISTLE AND TRAIN BELL IN ACCORDANCE WITH REGULATIONS.	TRAIN WHISTLE AND BELL.	AURAL SOUNDS.		RAILROAD HIGHWAY CROSSING ACCIDENTS ARE A MAJOR CAUSE OF RAILROAD DAMAGE AND INJURIES.

ENGINEMAN TASK ANALYSIS

0.4

TASK NO.
TASK TITLE
SUB-TASK NO.
SUB-TASK TITLE

ENTERING AND LEAVING SIDINGS

DIFFICULTY

HAZARD

CRITICALITY

DURATION

FREQUENCY

4

B, C, E

4

DEPENDENT UPON TRAIN LENGTH

AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ENTER SIDING.	SIGNAL ASPECT, TRAIN ORDER, LENGTH OF TRAIN AND LENGTH OF SIDING. TIME TABLE. OPERATING RULES.	SIGNAL LIGHT.	REASONS FOR ENTERING SIDING: (1) SIGNAL (2) TRAIN ORDER (3) SET OUT DAMAGED EQUIPMENT (4) PERMIT SUPERIOR TRAIN TO PASS. WILL TRAIN FIT IN PARTICULAR SIDING?	(a) MAKE NECESSARY SPEED ADJUSTMENT FOR ENTERING SIDING. (b) CHECK THAT SWITCH IS PROPERLY LINED. (c) MAINTAIN PROPER SPEED IN SIDING. (d) STOP, IF REQUIRED.	POWER AND BRAKE CONTROLS. SWITCH	MONITOR SPEEDOMETER.	IF MANUAL, ADVISE CREWMAN TO THROW SWITCH.	IF TRAIN DOES NOT CLEAR MAIN LINE, PROVIDE FLAGMAN PROTECTION AS REQUIRED FOR REAR END.
2.	LEAVING SIDING. REFERENCE TASK C.3.	SIGNAL ASPECT, FLAG OR HAND SIGNALS, ETC. OPERATING RULES.		IS CLEARANCE OBTAINED AND IS THE MAIN LINE CLEAR FOR ENTERING?	START TRAIN, IF STOPPED; OR CONTINUE MOVING, OBSERVING SIDING SPEED LIMITS. MOVE ONTO MAIN LINE IN ACCORDANCE WITH OPERATING RULES AND TIME TABLE.	REQUIRED TRAIN CONTROLS.	RECEIVE INPUT THAT CABOOSE HAS ENTERED THE MAIN LINE.	COMMUNICATE WITH CABOOSE PERSONNEL.	FLAGMAN PROTECTION MAY BE REQUIRED FOR HEAD END ON MAIN LINE.

ENGINEMAN TASK ANALYSIS

TASK NO.	D.5	DIFFICULTY	3
TASK TITLE	NEGOTIATING TURN OUTS AND CROSSOVERS	HAZARD	E
SUB-TASK NO.		CRITICALITY	3
SUB-TASK TITLE		OURATION	DEPENDENT UPON TRAIN LENGTH AND SPEED
		FREQUENCY	FREQUENTLY

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OPERATE TRAIN THROUGH TURN OUT AND/OR CROSSOVER.	VISIBLE OBSERVATION OF SWITCH.	SWITCH AND/OR SIGNAL.	SWITCH AND SIGNAL (IF AVAILABLE) ARE IN AGREEMENT. SWITCH PROPERLY LINED AND CLEARED FOR PASSAGE.	OPERATE TRAIN AT PRESCRIBED SPEED THROUGH TURNOUT OR CROSSOVER.	TRAIN CONTROLS.	PASSAGE THROUGH SWITCHES WITHOUT DERAILMENT.		

ENGINEMAN TASK ANALYSIS

D.6

TASK NO.
TASK TITLE
SUB-TASK NO.
SUB-TASK TITLE

PASSING EQUIPMENT ADJACENT TO TRACKS

DIFFICULTY
HAZARD
CRITICALITY
DURATION
FREQUENCY

3
B. C. E
3
DEPENDENT UPON TRAIN LENGTH AND SPEED
WHEN REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	SAFE MOVEMENT OF TRAIN PAST EQUIPMENT LOCATED ADJACENT TO TRACKS.	SIGNAL INDICATION OR OTHER KNOWLEDGE THAT EQUIPMENT IS LOCATED ADJACENT TO TRACKS.	HAND OR FLAG SIGNALS, SPECIAL BULLETINS, TRAIN ORDERS, ETC.	RULES GOVERNING SAFE MOVEMENT PAST EQUIPMENT ADJACENT TO TRACKS.	CONTROL TRAIN SO THAT SAFE PASSAGE IS OBTAINED. OBSERVE SPEED RESTRICTIONS, ETC.	TRAIN OPERATING CONTROLS.	VISUAL OBSERVATION.	CREWMEN WILL ASSIST BY OBSERVING PASSING EQUIPMENT AND OR PERSONNEL ADJACENT TO TRAIN.	EXERCISE EXTREME CAUTION WHEN PASSING EQUIPMENT AND WORKCREWS ADJACENT TO TRACKS.

ENGINEMAN TASK ANALYSIS

0.7

TASK NO.
TASK TITLE
SUB-TASK NO.
SUB-TASK TITLE

PASSING TRAIN ON ADJACENT TRACK

DIFFICULTY
HAZARD
CRITICALITY
DURATION
FREQUENCY

2
B, C, E
2
VARIABLE
AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OBSERVE PASSING TRAIN CLOSELY.	LOOK FOR HOT BEARINGS, BRAKES STICKING, WHEEL SLIDING, DRAGGING EQUIPMENT, INSECURE LADING OR OTHER DANGEROUS CONDITIONS.		RECOGNITION OF DANGEROUS CONDITIONS WHICH COULD CAUSE ACCIDENTS.	(1) VISUALLY INSPECT PASSING TRAIN FOR DANGEROUS CONDITIONS AND SO ADVISE.		PASSING TRAIN WILL STOP IF DANGEROUS CONDITIONS ARE NOTED.	ENGINEMAN ASSISTS OTHER CREWMEN IN VISUAL OBSERVATIONS.	
2.	OBSERVE TRAINMEN OR PASSING TRAIN.	LOOK FOR SIGNALS FROM TRAINMEN ON PASSING TRAIN.	HAND OR LIGHT SIGNALS.	RECOGNITION OF SIGNALS.	(1) STOP TRAIN IF SO ADVISED AND AND PERFORM INSPECTION OF TRAIN.	TRAIN CONTROLS, AS REQUIRED.	DEFECTIVE CONDITION WILL BE INSPECTED.	ADVISE CREW OF PROBLEM. THEY WILL ASSIST IN THE INSPECTION.	TAKE APPROPRIATE ACTION. DEPENDENT UPON DANGEROUS CONDITION (e.g. SET OUT CAR, NOTIFY DISPATCHER ETC.)
3.	OPERATE HEADLIGHT.	VISUAL AND/OR AURAL INDICATION OF APPROACHING TRAIN.	HEADLIGHT, WHISTLE.	NECESSARY TO DIM LIGHTS WHEN MEETING TRAIN.	OPERATE DIMMING CONTROL OF HEADLIGHT.	DIMMING SWITCH.	OBSERVE DECREASE IN LIGHT INTENSITY. APPROACHING TRAIN ALSO DIMS ITS LIGHT.		NIGHT OPERATIONS.
4.	OBSERVE RED SIGNAL LIGHT ON APPROACHING TRAIN.	OSCILLATING RED LIGHT.	MARS LIGHT.	INDICATION OF EMERGENCY ON APPROACHING TRAIN.	STOP TRAIN AND PROVIDE NECESSARY ASSISTANCE.	TRAIN CONTROLS.		ADVISE CREW OF IMPENDING STOP.	DO NOT PASS TRAIN WHICH HAS INDICATED EMERGENCY CONDITION.

ENGINEMAN TASK ANALYSIS

TASK NO.	0.8	DIFFICULTY	2
TASK TITLE	RECEIVING WAYSIDE MESSAGES	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	1 - 2 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RECEIVE INDICATION THAT ORDER OR MESSAGE IS AVAILABLE FOR PICK-UP.	WAYSIDE MESSAGE AHEAD.	HAND OR FLAG SIGNAL, PERSON WITH FORKED STICK, TRAIN ORDER SIGNAL.	DECIDE THAT MESSAGE PICK-UP IS REQUIRED.	(1) REDUCE SPEED, IF NECESSARY. (2) GRAB MESSAGE FROM FORKED STICK. (3) STOP, IF REQUIRED.	THROTTLE AND BRAKES. FORKED STICK WITH MESSAGE ATTACHED.	MESSAGE OBTAINED		CARE MUST BE EXERCISED WHEN REACHING OUT WINDOW TO GRAB MESSAGE.
2.	READ AND UNDERSTAND MESSAGE.	WRITTEN MESSAGE.	PAPER DOCUMENT(S).	COMPLIANCE WITH MESSAGE REQUIRED.	DEPENDENT UPON MESSAGE INSTRUCTION			MESSAGE READ BY HEAD END PERSONNEL AND REQUIRED ACTION AGREED UPON.	PREVENTS MISUNDERSTANDING OF MESSAGE.

ENGINEMAN TASK ANALYSIS

TASK NO.	E. 1	DIFFICULTY	2
TASK TITLE	LEAVING THE MAIN TRACK	HAZARD	B. E
SUB-TASK NO.	---	CRITICALITY	3
SUB-TASK TITLE	---	DURATION	DEPENDENT UPON TRAIN LENGTH AND SPEED
		FREQUENCY	AT END OF RUN

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	REFER TO TASK 0.4 DESCRIBING ENTERING SIDINGS.								
1.	ENTER THE YARD OR TERMINAL AT TERMINATION OF RUN.	VISUAL OBSERVATION OF TERMINAL SIGNALS AND SWITCHES.	SIGNAL LIGHTS, SIGNS AND SWITCHES.	CLEARANCE VIA TRAIN ORDER OR OTHER AUTHORITY HAS BEEN OBTAINED. VISIBLE INDICATION THAT TRACK AHEAD IS CLEAR TO PROCEED. KNOWLEDGE OF TERMINAL AND/OR YARD RULES AND REGULATIONS.	SAFELY MOVE TRAIN INTO TERMINAL IN ACCORDANCE WITH PRESCRIBED RULES. OBSERVING YARD SPEED LIMITS AND OPERATING INSTRUCTIONS.	TRAIN CONTROLS (e.g. THROTTLE, AIR BRAKES).		COMMUNICATION WITH TERMINAL PERSONNEL CONCERNING MOVEMENT WITHIN YARD OR TERMINAL.	CLEAR MAIN LINE AS SOON AS POSSIBLE PROVIDE REAR END PROTECTION IF MAIN LINE IS BLOCKED.

ENGINEWMAN TASK ANALYSIS

TASK NO.	E. 2	DIFFICULTY	4
TASK TITLE	STOPPING THE TRAIN	HAZARD	B. C. E
SUB-TASK NO.	E. 2. 1	CRITICALITY	4
SUB-TASK TITLE	BRAKING WITH POWER OFF	DURATION	1-2 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	GRADUALLY REDUCE THROTTLE TO IDLE.	TRACK AND TRAIN CONFIGURATION. SIGNAL TO STOP RECEIVED. TRAIN ORDERS.	SIGNAL LIGHT, FLAG OR OTHER SIGNAL DEVICE.	ENGINEWMAN DECIDES THAT BRAKING WITH POWER OFF IS THE DESIRED METHOD FOR THE STOP.	PLACE THROTTLE TO IDLE POSITION.	THROTTLE.	DECREASE IN SPEED AND ENGINE RPM NOTED.		
2.	GATHER SLACK.	KNOWLEDGE OF SLACK LOCATION WITHIN TRAIN.		DECISION TO GATHER SLACK BY USING EITHER INDEPENDENT OR DYNAMIC BRAKE.	(1) PLACE INDEPENDENT BRAKE HANDLE IN APPLICATION POSITION. (2) FOR USE OF DYNAMIC BRAKES, REFER TO TASKS A. 6 AND E. 2. 2.	INDEPENDENT BRAKE HANDLE.	AURAL SOUND OF AIR BRAKE APPLICATION. INCREASE IN B. C. PRESSURE.		

ENGINEMAN TASK ANALYSIS

TASK NO.	E. 2	DIFFICULTY	4
TASK TITLE	STOPPING THE TRAIN	HAZARD	C
SUB-TASK NO.	E. 2.2	CRITICALITY	3
SUB-TASK TITLE	DYNAMIC BRAKING	DURATION	40 SECONDS TO 3 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	SELECT DYNAMIC BRAKE MODE.			IS DYNAMIC BRAKING REQUIRED? DOES LOCOMOTIVE HAVE "EXTENDED RANGE" DYNAMIC BRAKING?					REFERENCE TASK A.6. THIS MODE PREVENTS EXCESSIVE WEARING OF BRAKE SHOES.
2.	BUNCH UP SLACK WHILE IN DYNAMIC BRAKE MODE.	ENGINE HAS MADE SATISFACTORY TRANSITION TO DYNAMIC BRAKE MODE.		ENGINEMAN KNOWS THAT SLACK MUST BE BUNCHED UP SLOWLY. EXERCISE PROPER SPEED AND SLACK CONTROL TECHNIQUES.	USING LOW VALUES OF DYNAMIC BRAKE CURRENT AND/OR INDEPENDENT BRAKE, SLOWLY BUNCH UP SLACK.	THROTTLE AND OR INDEPENDENT BRAKE.	PRIMARYLY, MOTION CUES.		IF BUNCHING IS ATTEMPTED TOO FAST, SEVERE SLACK ACTION MAY OCCUR RESULTING IN DAMAGE AND DERAILMENT.
3.	OPERATE THROTTLE TO DEVELOP DESIRED RETARDING FORCE WHEN IN DYNAMIC BRAKE MODE.	SPEED AND LOAD CURRENT.	SPEEDOMETER AND LOAD CURRENT METER.	ENGINEMAN MUST DECIDE THAT HE WANTS TO HAVE MORE OR LESS RETARDING FORCE DEVELOPED BY THE ENGINES. LOAD CURRENT METER INDICATES AMOUNT OF "PUSH" DURING DYNAMIC BRAKING.	MOVEMENT OF THROTTLE TO NEW POSITION.	THROTTLE	CHANGES IN THROTTLE POSITION WILL INTRODUCE A QUICK RESPONSE OF THE LOAD CURRENT AMMETER AND A SLOWER RESPONSE OF THE SPEEDOMETER.		

ENGINEMAN TASK ANALYSIS

TASK NO.	E. 2	DIFFICULTY	4
TASK TITLE	STOPPING THE TRAIN	HAZARD	B. C. E
SUB-TASK NO.	E. 2.3	CRITICALITY	4
SUB-TASK TITLE	AIR BRAKE APPLICATION	DURATION	2-3 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MAKE ONE SERVICE BRAKE APPLICATION CONSISTING OF TWO OR MORE REDUCTIONS:								
	(A) INITIAL REDUCTION OF AT LEAST 6 POUNDS.				MOVE AUTOMATIC BRAKE HANDLE TO OBTAIN INITIAL REDUCTION	AUTOMATIC BRAKE HANDLE	AIR SOUND IS HEARD. B.P. PRESSURE GAUGE DROPS B.C. PRESSURE GAUGE RISES. BRAKE FLOWMETER DEFLECTS		REFER TO TASK A 3
	(B) ADDITIONAL REDUCTION, SUCH THAT BRAKE PIPE EXHAUST IS OPEN WHEN TRAIN STOPS.				MOVE AUTOMATIC BRAKE HANDLE TO OBTAIN ADDITIONAL BRAKE APPLICATION.	AUTOMATIC BRAKE HANDLE	B.P. PRESSURE CONTINUES TO DROP. B.C. PRESSURE CONTINUES TO RISE.		

ENGINEMAN TASK ANALYSIS

E. 2

TASK NO.
TASK TITLE
SUB-TASK NO.
SUB-TASK TITLE

STOPPING THE TRAIN

E. 2. 4

BRAKING WITH POWER APPLIED

DIFFICULTY

4

HAZARD

B. C. E

CRITICALITY

4

DURATION

35 TO 45 SECONDS

FREQUENCY

AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MAKE SERVICE BRAKE APPLICATION, CONSISTING OF TWO OR MORE REDUCTIONS. MAKE INITIAL REDUCTION OF NOT LESS THAN 6 POUNDS NOR MORE THAN 15 POUNDS.	RESTRICTIVE SECTION OF TRACK, DOWN-HILL OR STATION APPROACHING. TRACK AND TRAIN CONFIGURATION.	SIGNAL LIGHT, FLAG OR OTHER SIGNAL DEVICE.	ENGINEMAN MUST HAVE DECIDED TO THE TRAIN. IS SANDING REQUIRED?	PLACE THE AUTOMATIC BRAKE HANDLE TO OBTAIN THE REQUIRED REDUCTION.	AUTOMATIC BRAKE HANDLE.	AIR SOUND IS HEARD. EQUALIZING RESERVOIR WILL DROP. BRAKE PIPE WILL ALSO DROP. CYLINDER (LOCOMOTIVE) WILL RISE. BRAKE FLOW METER DEFLECTS.	CONFIRM DECISION TO STOP (e.g. REO BOARD) WITH HEAD- END CREWMAN (i.e. FIREMAN, BRAKEMAN).	REFER TO TASK A. 5. DO NOT PERMIT THE LOCOMOTIVE BRAKE TO APPLY.
2.	BAILING OFF AUTOMATIC AIR BRAKE APPLICATION ON LOCOMOTIVE.	SOUND OF MINIMUM OR GREATER AIR REDUCTION. BRAKE CYLINDER AIR GAUGE INDICATES SOME PRESSURE IN BRAKE CYLINDERS.	BRAKE CYLINDER AIR GAUGE.	ENGINEMAN MUST DECIDE THAT BAILING IS NECESSARY.	PRESS DOWN THE INDEPENDENT HANDLE AND PLACE IN RELEASE POSITION.	INDEPENDENT BRAKE HANDLE.	SOUND OF BAIL PIPE CHARGING AND DISCHARGING IS HEARD. BRAKE CYLINDER PRESSURE WILL DROP TO ZERO. BRAKE FLOW METER DEFLECTS.	DO NOT PERMIT THE LOCOMOTIVE BRAKE TO APPLY.	

ENGINEMAN TASK ANALYSIS

E. 2

TASK NO.
TASK TITLE
SUB-TASK NO.
SUB-TASK TITLE

STOPPING THE TRAIN
E. 2. 5
MAINTAINING STRETCHED CONFIGURATION

DIFFICULTY
HAZARD
CRITICALITY
DURATION
FREQUENCY

5
B. C. E
5
AS REQUIRED
AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OPERATE THROTTLE TO KEEP TRAIN STRETCHED IF DESIRED.	KNOWLEDGE OF THE ROAD. TRAIN ORDER OR RESTRICTIVE SIGNAL. KNOWLEDGE OF WHERE SLACK IS IN THE TRAIN AT THE TIME.		ENGINEMAN MUST DECIDE THAT HE WANTS TO KEEP ALL SLACK IN TRAIN STRETCHED. LOAD CURRENT METER INDICATES AMOUNT OF "PULL" DURING TRACTIVE (POWER) MODE.	ADJUST THROTTLE SO THAT LOAD AMMETER SHOWS A STEADY PULL ON TRAIN, BUT NOT EXCESSIVE.	THROTTLE, LOAD CURRENT METER.	LOAD AMMETER INDICATES A CHANGE IN VALUE WITH A CHANGE IN THROTTLE SETTING. AURAL AND MOTION CUES ARE ALSO AVAILABLE.		AT LOWER SPEEDS WHERE BRAKES ARE MOST EFFECTIVE THE THROTTLE MUST BE USED VERY CAREFULLY TO AVOID EXCESSIVE COUPLER FORCES.

ENGINEMAN TASK ANALYSIS

TASK NO.	E. 2	DIFFICULTY	5
TASK TITLE	STOPPING THE TRAIN	HAZARD	B, C, E
SUB-TASK NO.	E. 2.6	CRITICALITY	5
SUB-TASK TITLE	AVOIDING EXCESS COUPLER FORCE	DURATION	1 TO 10 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	AVOID EXCESSIVE COUPLER FORCE WHILE SLOWING (SLACK STRETCHED)	LOAD CURRENT, SPEED AND MOTION CUES.	LOAD CURRENT AMMETER SPEEDOMETER.	ENGINEMAN MUST JUDGE HOW MUCH PULLING FORCE SHOULD BE EXERTED ON THE TRAIN BY THE LOCOMOTIVES.	MOVEMENT OF THROTTLE TO ADJUST POWER APPLIED TO TRAIN. MOVEMENT OF BRAKE CONTROL TO ADJUST RETARDING FORCE APPLIED TO LOCOMOTIVES FROM TRAIN.	THROTTLE AND INDEPENDENT BRAKE HANDLE.	LOAD CURRENT AMMETER RESPONDS TO CHANGES IN THROTTLE. BRAKE CYLINDER GAUGE RESPONDS TO CHANGES IN INDEPENDENT BRAKE CONTROL.		EXCESSIVE COUPLER FORCE WILL RESULT IN BREAK-IN-TWO. EXCESSIVE LATERAL FORCES MAY CAUSE DERAILMENT.

ENGINEMAN TASK ANALYSIS

TASK NO.	E. 2	DIFFICULTY	4
TASK TITLE	STOPPING THE TRAIN	HAZARD	C, E
SUB-TASK NO.	E. 2. 7	CRITICALITY	4
SUB-TASK TITLE	LOW VELOCITY CONTROL	DURATION	1 TO 20 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OBSERVE SPECIAL PRECAUTIONS AT LOW VELOCITIES WHERE BRAKES ARE MOST EFFECTIVE.	SPEED AND AIR PRESSURE READINGS.	SPEEDOMETER AND AIR GAUGES.	ENGINEMAN MUST ADJUST SLACK IN TRAIN AT HIGHER VELOCITIES AND MAINTAIN THIS SLACK CONDITION UNTIL TRAIN STOPS.	ENGINEMAN MUST CONTROL POWER DYNAMIC BRAKES AND INDEPENDENT BRAKES IN ORDER TO KEEP SLACK CONTROLLED. OPERATE SANDING LEVERS.	(REFERENCE TASKS A. 2 THROUGH A. 6). (REFERENCE TASK A. 8)	PROPERLY HANDLED, THE STOP WILL BE SMOOTH. IMPROPERLY HANDLED, THE STOP WILL BE ROUGH.		DAMAGE TO TRAIN AND OR LADING OR PERSONAL INJURY COULD RESULT IF IMPROPERLY HANDLED. ALWAYS SAND WHEN STOPPING.

ENGINEMAN TASK ANALYSIS

TASK NO.	E. 2	DIFFICULTY	4
TASK TITLE	STOPPING THE TRAIN	HAZARD	C
SUB-TASK NO.	E. 2.B	CRITICALITY	4
SUB-TASK TITLE	FINAL REDUCTION	DURATION	5 TO 90 SECONDS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1	OBSERVE AIR GAUGES AND AIR FLOW METER TO DETERMINE AMOUNT OF FINAL REDUCTION.	AIR PRESSURE AND AIR FLOW READINGS.	TWO DUPLEX AIR GAUGES AND THE AIR FLOW METER.	ENGINEMAN MUST KNOW THAT A FURTHER REDUCTION IN AIR BRAKES IS NECESSARY.	MOVE THE AUTOMATIC BRAKE VALVE IN THE SERVICE POSITION, OBSERVING THE EQUALIZING RESERVOIR DECREASES TO A NEW VALUE. ALSO OBSERVE THE BRAKE PIPE GAUGE DECREASE TO THE SAME VALUE WITH TIME DELAY.	AUTOMATIC BRAKE VALVE HANDLE.	AIR FLOW SOUND IS HEARD. EQUALIZING AND BRAKE PIPE GAUGE DECREASE, BRAKE CYLINDER GAUGE WILL START TO RISE.		

ENGINEMAN TASK ANALYSIS

TASK NO.	E. 2	DIFFICULTY	3
TASK TITLE	STOPPING THE TRAIN	HAZARD	-
SUB-TASK NO.	E. 2.9	CRITICALITY	3
SUB-TASK TITLE	STOP ON RECEIVING TRACK	DURATION	10 - 20 MINUTES
		FREQUENCY	AT COMPLETION OF RUN

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MOVE TRAIN TO DESIGNATED TRACK AND STOP.	LEVEL GRADE. LOW TRAIN SPEED. LOCATION OF SLACK WITHIN TRAIN.	KNOWLEDGE OF TERMINAL. SPEEDOMETER	DECISION TO INITIATE STOP AS RECEIVING AREA APPROACHES.	(1) CLOSE THROTTLE. (2) MAKE AUTOMATIC SERVICE REDUCTION.	THROTTLE. AUTOMATIC BRAKE HANDLE.	PHYSICAL FEELING THAT SLACK ACTION WITHIN TRAIN IS NOT EXCESSIVE		BE CAREFUL NOT TO OVERHEAT BRAKES AND WHEELS. FINAL REDUCTION IS SUCH THAT BRAKE PIPE EXHAUST IS OPEN AS TRAIN COMES TO REST (REFER TO TASK E 2.8)

TASK NO.	E. 3		2
TASK TITLE	DETACH AND STORE LOCOMOTIVE(S)	DIFFICULTY	
SUB-TASK NO.	E. 3. 1	HAZARD	-
SUB-TASK TITLE	DETACH LOCOMOTIVE	CRITICALITY	3
		DURATION	5 - 10 MINUTES
		FREQUENCY	ONCE PER RUN

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ENGINEMAN TASK ANALYSIS

TASK NO.	E. 3	DIFFICULTY	3
TASK TITLE	DETACH AND STORE LOCOMOTIVE(S)	HAZARD	B, E
SUB-TASK NO.	E. 3.2	CRITICALITY	5
SUB-TASK TITLE	STORE LOCOMOTIVE	DURATION	5 - 10 MINUTES
		FREQUENCY	ONCE PER RUN

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	MOVE LOCOMOTIVE TO SPECIFIED STORAGE AREA.	REFER TO TASK B. 5 FOR OPERATION OF THE LOCOMOTIVE CONSIST.		DECISION TO STORE LOCOMOTIVE WITH ENGINE RUNNING SO THAT INADVERTENT MOTION WILL NOT OCCUR.	(1) PLACE THROTTLE TO IDLE (2) PLACE SELECTOR LEVER TO OFF. (3) PLACE REVERSER TO NEUTRAL; REMOVE HANDLE AND STORE. (4) TURN OFF GENERATOR FIELD SWITCH. (5) APPLY LOCOMOTIVE BRAKES (FULL APPLICATION) (6) SET HAND BRAKES ON LOCOMOTIVES AND BLOCK WHEELS, IF NECESSARY. (7) LOCK CAB DOORS.	THROTTLE HANDLE SELECTOR LEVER REVERSER LEVER GENERATOR FIELD SWITCH INDEPENDENT BRAKE HANDLE. HAND BRAKES, WHEEL BLOCKS AND CHAINS.	VISUAL OBSERVATION OF CONTROLS AND GAUGES. INSPECTION OF HAND BRAKES, ETC.		SAFETY PRECAUTION TO PREVENT RUNAWAY LOCOMOTIVE.
2.	PREPARE LOCOMOTIVE FOR UNATTENDED STORAGE.								

ENGINEMAN TASK ANALYSIS

TASK NO.	E. 4	DIFFICULTY	1
TASK TITLE	COMPLETE PAPERWORK	HAZARD	-
SUB-TASK NO.	---	CRITICALITY	1
SUB-TASK TITLE	---	DURATION	5 - 10 MINUTES
		FREQUENCY	AT END OF RUN

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	COMPLETE REQUIRED FORMS (e.g. MAINTENANCE WORK REPORT)	DEFECTS NOTED DURING RUN.		IMPORTANCE OF PROPER COMPLETION OF PAPERWORK IS REALIZED.	FILL OUT ALL REQUIRED PAPERWORK.	WRITING IMPLEMENTS AND FORMS.	VISUAL OBSERVATION.	DISCUSS DEFECTS NOTED WITH CREW MEMBERS.	MAKE REPORTS COMPLETE, ACCURATE AND LEGIBLE.
2.	REGISTER OFF DUTY.	PRIOR TO LEAVING TERMINAL.		ALL TASK COMPLETED PRIOR TO SIGNING OUT?	SIGN OUT ON REGISTER BOARD OR BOOK.	WRITING IMPLEMENTS AND FORMS.	VISUAL OBSERVATION.		

ENGINEMAN TASK ANALYSIS

TASK NO.	F. 1	DIFFICULTY	3
TASK TITLE	RESPONDING TO OBSTRUCTIONS	HAZARD	B. E
SUB-TASK NO.	---	CRITICALITY	4
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	DEAL WITH ANIMALS ON TRACK, TRACK BLOCKAGE, TRACK WASHOUT OR REPAIR CREWS ON TRACK.	OBSERVATION OF HAZARD ON TRACK, TEMPORARY SPEED RESTRICTION SIGNS, SPECIAL INSTRUCTIONS ON TRAIN ORDERS, RECEIVED WARNING VIA RADIO/TELEPHONE.	RADIO TELEPHONE	ENGINEMAN MUST DECIDE WHAT ACTION TO TAKE, I.E., BLOW HORN, SLOW DOWN, OR PLACE TRAIN INTO EMERGENCY BRAKE OPERATION.	BLOW AIR HORN, MAKE A SERVICE REDUCTION, OR MAKE AN EMERGENCY APPLICATION.	AIR HORN, BRAKES.	SOUND OF AIR HORN OR AIR REDUCTION WILL BE HEARD.		IF RESTRICTED SPEED AREAS ARE IGNORED, IT IS POSSIBLE THAT A VERY SERIOUS ACCIDENT COULD OCCUR.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.2	DIFFICULTY	2
TASK TITLE	RESPONDING TO TORPEDOES AND FUSEES	HAZARD	B. E
SUB-TASK NO.		CRITICALITY	2
SUB-TASK TITLE		DURATION	2-3 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONDING TO TORPEDOES.	AURAL SOUND OF TORPEDO EXPLODING.		DECISION TO SLOW OR STOP TRAIN IN ACCORDANCE WITH RULES RELATIVE TO THIS WARNING DEVICE. A.A.R. RULE 15 - PROCEED AT REDUCED SPEED.	PROCEED WITH CAUTION, PREPARED TO STOP WITHIN THE NEXT TWO MILES AT RED LIGHT OR FLAG.	TRAIN CONTROLS.	OBSERVATION OR RED SIGNAL FOLLOWING TORPEDO SIGNAL.		NORMALLY, MORE THAN ONE TORPEDO IS INSTALLED TO INSURE THAT WARNING ACTIVATES.
2.	RESPONDING TO FUSEES.	VISUAL OBSERVATION OF FUSEE.		DECISION TO SLOW OR STOP TRAIN IN ACCORDANCE WITH RULES RELATIVE TO THIS WARNING DEVICE. IS FUSEE UNATTENDED? A.A.R. RULE 11 - PROCEED AT REDUCED SPEED FOR NOT LESS THAN ONE MILE.	STOP TRAIN AND WAIT UNTIL FUSEE BURNS OUT.	TRAIN CONTROLS			

ENGINEERMAN TASK ANALYSIS

F. 3

TASK NO.
TASK TITLE
SUB-TASK NO.
SUB-TASK TITLE

RESPONDING TO TEMPORARY RESTRICTIONS & SLOW BOARDS.

DIFFICULTY
HAZARD
CRITICALITY
DURATION
FREQUENCY

2
8, E
2
30 SECONDS
AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO TEMPORARY RESTRICTIONS AND SLOW BOARDS.	SIGNAL TO PROCEED AT REDUCED SPEED AND WITH CAUTION.	HAND OR FLAG SIGNALS, SIGNAL LIGHTS, SLOW BOARDS, TRAIN ORDERS, ETC.	RECOGNITION OF SIGNALS WHICH INDICATE RESTRICTIVE MOVEMENTS. KNOWLEDGE OF RULES RELATIVE TO RESTRICTIONS AND SLOW BOARDS.	REDUCE SPEED, ETC. IN COMPLIANCE WITH SIGNAL.	REFER TO DECELERATING AND BRAKING TASKS A. 2 THROUGH A. 6.	OBSERVE SAFE OPERATION IN RESTRICTIVE AREA.		COMPLIANCE WITH RULES WILL PREVENT DAMAGE AND OR INJURY.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.4	DIFFICULTY	2
TASK TITLE	RESPONDING TO IMPROPER SIGNALS	HAZARD	B, C, E
SUB-TASK NO.		CRITICALITY	4
SUB-TASK TITLE		DURATION	2 - 3 MINUTES
		FREQUENCY	INFREQUENTLY

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OBSERVE SIGNAL IMPROPERLY DISPLAYED, ABSENCE OF SIGNAL, OR ABSENCE OF LIGHT OR WHITE LIGHT DISPLAYED WHERE COLORED LIGHT SHOULD BE IN A FIXED SIGNAL.	IMPROPER SIGNAL.	SIGNAL LIGHT	WHAT IS THE MOST RESTRICTIVE CONDITION THAT SIGNAL COULD INDICATE?	(1) RESPOND, ASSUMING SIGNAL DISPLAYS THE MOST RESTRICTIVE CONDITION. (2) ADVISE DISPATCHER OF IMPROPER SIGNAL.	REQUIRED TRAIN CONTROLS. RADIO TELEPHONE	CONFIRM DECISION CONCERNING SIGNAL WITH HEAD END CREW MEMBER.	HEAD END CREWMAN.	
2.	OBSERVE IMPROPER OR ABSENCE OF PROPER SIGNAL COMMUNICATION.	NO, IMPROPER OR MISUNDERSTOOD SIGNAL.	HAND, FLAG, OR VERBAL COMMAND. RADIO TELEPHONE.		(1) STOP TRAIN, IF CONDITIONS WARRANT WHEN SIGNAL COMMUNICATION IS LOST OR MISUNDERSTOOD.	TRAIN CONTROLS.		CREW MEMBERS OR GROUND PERSONNEL.	CLARITY IN SIGNALING IS EXTREMELY IMPORTANT TO PREVENT MISUNDERSTANDING.

ENGINEER TASK ANALYSIS

TASK NO.	F. 5	DIFFICULTY	3
TASK TITLE	RESPONDING TO DEGRADED DYNAMIC BRAKING	HAZARD	B. C. E
SUB-TASK NO.	---	CRITICALITY	4
SUB-TASK TITLE	---	DURATION	1 - 2 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO DEGRADATION OF DYNAMIC BRAKING.	HEAVY GRADE. DYNAMIC IS LOST OR BECOMES INEFFECTIVE.	LOAD CURRENT METER.	QUICKLY DETERMINE REASON FOR REDUCED DYNAMIC. POSSIBLE REASONS ARE: (1) DYNAMIC BRAKE CIRCUIT BREAKER OPEN. (2) FAILURE OF DYNAMIC ON ONE OR MORE UNITS.	(1) RESET DYNAMIC BRAKE C.B. (2) STOP TRAIN QUICKLY. BEFORE TRAIN GETS OUT OF CONTROL.	DYNAMIC BRAKE C.B. EMERGENCY BRAKE APPLICATION	DYNAMIC BRAKE AMPERAGE INCREASES. EMERGENCY TRAIN STOP RESULTS.		DO NOT PERMIT TRAIN TO BECOME UNCONTROLLED - ABLE ON HEAVY GRADE.

ENGINEMAN TASK ANALYSIS

F.6

TASK NO.	3
TASK TITLE	RESPONDING TO DEGRADED TRACTION MOTOR OPERATION
SUB-TASK NO.	4
SUB-TASK TITLE	3 - 5 MINUTES AS REQUIRED

DIFFICULTY	3
HAZARD	H
CRITICALITY	4
DURATION	3 - 5 MINUTES
FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO DEGRADATION OF TRACTIVE EFFORT. REFERENCE:	REDUCTION IN LOAD CURRENT. TASK F.8 TASK F.12.2	LOAD CURRENT AMMETER. NO THROTTLE RESPONSE NO POWER		DEPENDENT UPON CAUSE. ISOLATE THE DEFECTIVE UNIT BY PLACING RUN/ISOLATE SWITCH TO "ISOLATE."	RUN/ISOLATE SWITCH			
2.	RESPONSE TO TRACTION MOTOR FLASHOVER.	LOUD, CRACKING NOISE AND/OR SOUND LIKE CLAP OF THUNDER. HOT OIL SMELL. SMOKE OR FIRE FROM TRACTION MOTOR SUPPORT OR ARMATURE BEARING. H.V. GROUND WARNING LIGHT MAY ILLUMINATE (REFER TASK F.12.5).	HIGH VOLTAGE GROUND WARNING LIGHT.	DETERMINE DEGREE OF HEATING AND DECIDE IF SAFE TO CONTINUE OR IF UNIT MUST BE SET OUT.	EITHER ISOLATE UNIT OR CUT-OUT TRACTION MOTOR, IF UNIT IS SO EQUIPPED. CHECK HEATING OF MOTOR SUPPORT BEARING AND ARMATURE BEARING.	RUN ISOLATE SWITCH OR TRACTION MOTOR CUT-OUT SWITCH.	IF BEARINGS ARE TOO HOT, UNIT WILL BE SET OUT.		MAY PREVENT FURTHER DAMAGE TO DEFECTIVE UNIT.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.7	DIFFICULTY	4
TASK TITLE	RESPONDING TO DIESEL ENGINE DEFECTS	HAZARD	H
SUB-TASK NO.		CRITICALITY	4
SUB-TASK TITLE		DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ENCOUNTERING THE PROBLEM OF ERRATIC ENGINE OPERATION.	ENGINE OPERATES ERRATICALLY. LOOK FOR FOLLOWING CONDITIONS: (a) SMOKE/FIRE. (b) LEAKING FUEL (c) WATER COMING OUT OF STACK. (d) THUMPING OR POUNDING SOUND. (e) OIL IN WATER SIGHT GLASS. (f) LACK OF FUEL.		DECISION THAT ERRATIC ENGINE OPERATION IS DUE TO SERIOUS DEFECT AND ENGINE SHOULD BE SHUT DOWN.	SHUT DOWN ENGINE BY EITHER DEPRESSING BUTTOM OR MOVING THROTTLE TO STOP. DETERMINE EXACT CAUSE OF ERRATIC OPERATION. NOTIFY DISPATCHER OF ACTION TAKEN AND PROVIDE PROTECTION FOR STOPPED TRAIN.	"EMERGENCY FUEL CUT-OFF AND ENGINE STOP" BUTTOM OR THROTTLE.	AURAL SOUND THAT ENGINE HAS SHUT DOWN.	NOTIFY CREW MEMBER OF REASON FOR SHUT DOWN.	

ENGINEMAN TASK ANALYSIS

F. 8

TASK NO.	RESPONDING TO NO THROTTLE RESPONSE	DIFFICULTY	4
TASK TITLE		HAZARD	-
SUB-TASK NO.		CRITICALITY	2
SUB-TASK TITLE		OURATION	DEPENDENT ON CAUSE
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ENCOUNTERING THE PROBLEM OF NO THROTTLE RESPONSE.	ENGINE SPEED ODES NOT INCREASE WHEN THROTTLE IS ADVANCED.		ER RELAY IS NOT ENERGIZED; DETERMINE CAUSE. FOR ER RELAY TO BE ENERGIZED, THE FOLLOWING CONDITIONS MUST BE SATISFIED: 1) GROUND AND FAULT RELAYS SET. 2) MVR ENERGIZED. 3) ISOLATION SWITCH IN RUN. 4) PCS SET. 5) ENGINE RUN SWITCH - ON. 6) CONTROL C.B. AND CONTROL AND FUEL PUMP SWITCH - ON. 7) BWD. TRAN. RELAY FUNCTIONING. 8) EXCITATION LIMIT AND OVER VOLTAGE, RELAYS FUNCTIONING.	ISOLATE UNIT AND NOTIFY DISPATCHER. DETERMINE AND CORRECT FAULT, IF POSSIBLE.	MAY REQUIRE RADIO/TELEPHONE IF PROBLEM CAN NOT BE CLEARED ON THE ROAD. DEPENDENT UPON CAUSE.	FOLLOWING ELIMINATION OF CAUSE, ENGINE RESPONDS TO THROTTLE CHANGES.		ISOLATE UNIT FIRST BEFORE CORRECTING CAUSE OF MALFUNCTION TO PREVENT INADVERTENT APPLICATION OF POWER AFTER CORRECTION.

ENGINEMAN TASK ANALYSIS

F.9

TASK NO.

TASK TITLE

SUB-TASK NO.

SUB-TASK TITLE

RESPONDING TO ENGINE SHUTDOWN

DIFFICULTY

HAZARD

CRITICALITY

DURATION

FREQUENCY

3

H

4

DEPENDENT UPON IDENTIFIED CAUSE

AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ENCOUNTERING THE PROBLEM OF ENGINE SHUT DOWN DURING OPERATION	ENGINE SHUT DOWN.		DETERMINE CAUSE FOR ENGINE SHUTDOWN: a) ENGINE OVER-SPEED TRIP. b) LOW OIL BUTTON ON GOVERNOR OUT. c) CRANKCASE PRESSURE/LOW WATER DETECTION TRIPPED. d) LACK OF FUEL. e) AUXILIARY GENERATOR FUSES BLOWN. f) FPC DE-ENERGIZED.	INITIATE APPROPRIATE ACTION TO ELIMINATE DETECTED CAUSE.	DEPENDENT UPON CAUSE.	FOLLOWING ENGINE RESTART, ENGINE CONTINUES TO RUN SATISFACTORILY.		EXERCISE CAUTION IN RESTARTING A HOT ENGINE.

ENGINEMAN TASK ANALYSIS

TASK NO.	F. 10	DIFFICULTY	3
TASK TITLE	RESPONDING TO LOSS OF SAND	HAZARD	B, C
SUB-TASK NO.	—	CRITICALITY	2
SUB-TASK TITLE	—	DURATION	3 - 5 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO LOSS OF SAND.	DURING MANUAL OR AUTOMATIC SANDING, NO SAND AVAILABLE FOR IMPROVED TRACTIVE EFFORT.	SANDING LIGHT.	DECISION THAT IMPROVED ADHESION NORMALLY PROVIDED BY SANDING IS REQUIRED TO: (a) PREVENT WHEEL SLIP (b) STOP WITHIN SPECIFIED DISTANCE.	(a) RETARD THROTTLE TO PREVENT WHEEL SLIP. (b) IF AVAILABLE, INCREASE BRAKING EFFORT.	THROTTLE, WHEEL SLIP INDICATOR. BRAKING CONTROLS	WHEEL SLIP LIGHT GOES OUT AND SLIPPING STOPS. TRAIN CONTINUES TO DECELERATE AT DESIRED RATE.		IT MAY BE NECESSARY TO MAKE AN EMERGENCY BRAKE APPLICATION TO STOP WITHIN PRESCRIBED LIMITS.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.11	DIFFICULTY	3
TASK TITLE	RESPONDING TO BATTERY DISCHARGE	HAZARD	M
SUB-TASK NO.	—	CRITICALITY	1
SUB-TASK TITLE	—	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ENCOUNTERING PROBLEM OF BATTERY DISCHARGE.	OBSERVE AMMETER IN DISCHARGE (RED) ZONE.	BATTERY CHARGING AMMETER.	POSSIBLE CAUSE: a) FAILURE OF AUXILIARY GENERATOR FUSE. b) FAILURE OF AUXILIARY GENERATOR FIELD FUSE (30 AMP) c) INOPERATIVE VOLTAGE REGULATOR.	DETERMINE CAUSE AND CORRECT, IF POSSIBLE. IF IN CASE THE FAULT CANNOT BE FOUND, THE ENGINE CAN CONTINUE TO OPERATE WITHOUT ADVERSE EFFECTS. REPORT LATER ON WORK REPORT FORM.		IF CAUSE IS ELIMINATED, BATTERY METER WILL READ EITHER ZERO OR IN THE CHARGE (GREEN) AREA.		
2.	IN CONJUNCTION WITH ENGINE FAILING TO START.	ENGINE WILL NOT START.		KNOWLEDGE OF POTENTIAL DANGEROUS SITUATION.	ADVISE PERSONNEL TO CHECK BATTERY POLARITY BEFORE CONTINUING ATTEMPTS AT STARTING.	BATTERY TERMINALS		ADVISE GROUND PERSONNEL OF CONDITIONS.	CAUTION - BATTERY MAY BE HOOKED UP WITH POLARITY REVERSED, WHICH COULD RESULT IN GASES ESCAPING AND OR EXPLOSION.

ENGINEMAN TASK ANALYSIS

TASK NO.
TASK TITLE
SUB-TASK NO.
SUB-TASK TITLE

F.12
RESPONDING TO ALARM BELL
—
—

DIFFICULTY
HAZARD
CRITICALITY
DURATION
FREQUENCY

4
A
3
DEPENDENT UPON PARTICULAR FAULT
AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONDING TO ALARM SIGNALS.	ALARM BELL RINGS, NO ALARM SIGNAL LIGHTS ON ENGINE CONTROL PANEL.	ALARM BELL	DETERMINE IF FAULT IS IN TRAILING UNIT OR IN GENERATOR EXCITATION SYSTEM OF LEAD UNIT.	1) IF BAD UNIT GOES TO IDLE AND ALARM OCCURS REPEATEDLY, ISOLATION OF THE UNIT IS REQUIRED. 2) IF FAULT IS NOT IN LEAD UNIT, DETERMINE WHICH FAULT IN WHAT TRAILING UNIT IS CAUSING ALARM AND CORRECT, IF POSSIBLE.	DEPENDENT UPON CAUSE (REFER TO FOLLOWING TASKS.)	ALARM WILL STOP WHEN FAULT IS EITHER CORRECTED OR ISOLATED.		TAKING AFFECTED UNIT OFF LINE WILL SILENCE ALARM BELL. EXERCISE CAUTION NEAR HIGH VOLTAGE (800 VOLTS) IN LOCOMOTIVE CABINETS.

ENGINEER TASK ANALYSIS

TASK NO.	F.12	DIFFICULTY	3
TASK TITLE	RESPONDING TO ALARM BELL	HAZARD	M
SUB-TASK NO.	F.12.1	CRITICALITY	3
SUB-TASK TITLE	CAUSE: HOT ENGINE	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO ALARM BELL.	ALARM BELL RINGS, HOT ENGINE LIGHT ILLUMINATES ON ENGINE CONTROL PANEL. NO LOSS OF ENGINE SPEED OR POWER IS NOTICED.	ALARM BELL AND WARNING LIGHT.	INDICATION THAT ENGINE COOLING WATER TEMPERATURE IS EXCESSIVE.	REDUCE WATER TEMPERATURE BY: 1) ISOLATING UNIT AND PERMIT ENGINE TO RUN AT IDLE SPEED. 2) ADD WATER IF REQUIRED. 3) MAKE SURE COOLING FANS ARE OPERATING. 4) OPEN SHUTTERS.		ALARM BELL STOPS RINGING WHEN WATER TEMPERATURE REDUCES SUFFICIENTLY.		CAUTION: IF IT BECOMES NECESSARY TO SHUT DOWN A HOT ENGINE, EXERCISE EXTREME CAUTION IF RESTART IS ATTEMPTED BEFORE ENGINE HAS SUFFICIENT TIME TO COOL. FIRE AND/OR EXPLOSION POSSIBLE IF MANY CRANKINGS ARE TRIED.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.12	DIFFICULTY	4
TASK TITLE	RESPONDING TO ALARM BELL	HAZARD	-
SUB-TASK NO.	F.12.2	CRITICALITY	3
SUB-TASK TITLE	CAUSE: NO POWER	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1	RESPONSE TO ALARM BELL.	ALARM BELL RINGS, "NO POWER" LIGHT ILLUMINATES ON AFFECTED UNIT.	ALARM BELL AND WARNING LIGHT.	<p>DETERMINE IF ENGINE HAS STOPPED OR IF THERE HAS BEEN AN ALTERNATOR FAILURE.</p> <p>POSSIBLE CAUSES:</p> <p>1) ENGINE STOPPED.</p> <p>a) OVERSPEED TRIP</p> <p>b) LACK OF FUEL</p> <p>c) FPC DE-ENERGIZED.</p> <p>2) ALTERNATOR FAILURE (ENGINE IDLEING)</p> <p>a) BLOWN FUSE</p> <p>- ALTERNATOR FIELD</p> <p>- AUX. GENERATOR</p> <p>- AUX. GEN. FIELD</p>	ISOLATE UNIT AND DETERMINE CAUSE OF FAILURE.	RUN/ISOLATE SWITCH TO "ISOLATE" ON AFFECTED UNIT.	ALARM BELL STOPS. LIGHT EXTINGUISHES WHEN CAUSE HAS BEEN CORRECTED (AND ENGINE RESTARTED IF REQUIRED).		

ENGINEMAN TASK ANALYSIS

TASK NO.	F.12	DIFFICULTY	4
TASK TITLE	RESPONDING TO ALARM BELL	HAZARD	A
SUB-TASK NO.	F.12.3	CRITICALITY	3
SUB-TASK TITLE	CAUSE: LOW OIL/WATER/PRESSURE	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO ALARM BELL.	ALARM BELL RINGS, LOW OIL/LOW WATER/ CRANKCASE PRESSURE LIGHT ILLUMINATES. DIESEL ENGINE WILL STOP. GOVERNOR TRIP BUTTON WILL BE OUT.	ALARM BELL AND WARNING LIGHT.	DETERMINATION OF CAUSE FROM FOLLOWING POSSIBILITIES: a) LOW OIL PRESSURE IN DIESEL ENGINE OR TURBOCHARGER. b) CRANKCASE PRESSURE/ LOW WATER DEVICES TRIPPED.	ISOLATE UNIT TO STOP ALARM BELL. RESET GOVERNOR TRIP BUTTON. CHECK ENGINE LUB OIL LEVEL USING DIP STICK (SHOULD BE NEARLY FULL). OBSERVE FOR EXTERNAL OIL LEAKS. CHECK LOW WATER AND CRANKCASE PRESSURE DETECTING DEVICE PUSHBUTTONS.	RUN/ISOLATE SWITCH TO "ISOLATE." DEPENDENT UPON CAUSE.	VISUAL OBSERVATION OF: a) EXCESSIVE CRANKCASE (OIL PAN) PRESSURE BUTTON PROTRUDES. b) LOW WATER BUTTON PROTRUDES. c) LEAKS.		DO NOT ATTEMPT TO RESTART ENGINE.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.12	DIFFICULTY	4
TASK TITLE	RESPONDING TO ALARM BELL	HAZARD	-
SUB-TASK NO.	F.12.4	CRITICALITY	3
SUB-TASK TITLE	CAUSE: ENGINE SHUT DOWN	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO ALARM BELL.	ENGINE SHUT DOWN AND (a) OIL PRESSURE BUTTON PROTRUDING. (b) LOW WATER LEVEL BUTTON PROTRUDING. ALARM BELL RINGS.	ALARM BELL AND TRIP BUTTONS.	DETERMINATION OF CAUSE FOR LOW PRESSURE, LOW WATER LEVEL, OR LOW GOVERNOR OIL.	TAKE NECESSARY CORRECTIVE ACTION. MANUALLY RESET THE APPROPRIATE TRIP BUTTON BY HOLDING IT IN FOR 5 SECONDS. IF LOW OIL IS IS PROBLEM, ALSO RESET THE GOVERNOR LOW OIL TRIP. RESTART ENGINE AFTER TRIP BUTTONS HAVE BEEN RESET.		ENGINE WILL START AND CONTINUE TO RUN IF CORRECTIVE ACTION WAS PROPER. OIL PRESSURE GAUGE WILL READ GREATER THAN 9 psi WITH IDLING ENGINE.		EXERCISE CAUTION IN RESTARTING AN ENGINE THAT WAS JUST SHUT DOWN. WAIT SUFFICIENT TIME TO PERMIT ENGINE TO COOL.

ENGINEERMAN TASK ANALYSIS

TASK NO.	F.12	DIFFICULTY	3
TASK TITLE	RESPONDING TO ALARM BELL	HAZARD	A. H
SUB-TASK NO.	F.12.5	CRITICALITY	4
SUB-TASK TITLE	CAUSE: HIGH VOLTAGE GROUND	DURATION	5 - 10 SECONDS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO ALARM BELL.	ALARM BELL RINGS. HIGH VOLTAGE GROUND LIGHT ILLUMINATES. ENGINE SPEED REDUCES TO IDLE AND POWER IS LOST.	ALARM BELL, LIGHT.	CAUSE OF HIGH VOLTAGE GROUND MUST BE DETERMINED IF POSSIBLE. POSSIBLE CAUSES: (a) INSULATION FAILURE (b) TRACTION MOTOR FLASHOVER. (c) PRESENCE OF WATER (d) ELECTRICAL COMPONENT FAILURE.	PRESS GROUND RELAY RESET BUTTON IN ACCORDANCE WITH PRESCRIBED REGULATIONS. ADVISE DISPATCHER IF UNIT CAN NOT BE RESTORED.	GROUND RELAY RESET BUTTON.	IF FAULT IS CORRECTED, POWER WILL BE RESTORED AND ENGINE SPEED WILL RESPOND TO THROTTLE SETTING.		DO NOT ATTEMPT GROUND RESET MORE THAN 3 TIMES BEFORE ISOLATING THE UNIT.
2.	ISOLATE AFFECTED UNIT.	GROUND RESET NOT POSSIBLE.			PLACE RUN/ISOLATE SWITCH TO "ISOLATE"	RUN/ISOLATE SWITCH.	AURAL AND VISUAL OBSERVATION		ASCERTAIN THAT ALL WHEELS ARE FREE TO ROTATE PROPERLY BEFORE LEAVING UNIT IN CONSIST.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.12	DIFFICULTY	2
TASK TITLE	RESPONDING TO ALARM BELL	HAZARD	-
SUB-TASK NO.	F.12.6	CRITICALITY	1
SUB-TASK TITLE	CAUSE: EXCITATION LIMIT	DURATION	5 - 10 SECONDS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO ALARM BELL.	ALARM BELL RINGS AND EXCITATION LIMIT LIGHT ILLUMINATES.	ALARM BELL AND GREEN LIGHT.	DETERMINE IF TEMPORARY OR SUSTAINED CONDITION.	PLACE RUN/ISOLATE SWITCH TO "ISOLATE". PLACE RUN/ISOLATE SWITCH BACK TO "RUN."	RUN/ISOLATE SWITCH. RUN/ISOLATE SWITCH.	ALARM STOPS RINGING AND LIGHT GOES OUT. (A) ALARM AND LIGHT STAY OFF. (B) ALARM AND LIGHT COME ON.		TEMPORARY CONDITION: OKAY TO PROCEED. SUSTAINED CONDITION: AGAIN ISOLATE THE UNIT.

ENGINEER TASK ANALYSIS

TASK NO.	F.13	DIFFICULTY	3
TASK TITLE	RESPONDING TO LOCOMOTIVE OVERSPEED	HAZARD	B, C, D, E
SUB-TASK NO.	—	CRITICALITY	4
SUB-TASK TITLE	—	DURATION	1-2 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO LOCOMOTIVE OVERSPEED CONDITION.	PENALTY BRAKE WHISTLE SOUNDS.	SPEEDOMETER.	TRAIN SPEED HAS EXCEEDED SAFE VALUE FOR LOCOMOTIVE TRACTION MOTORS AND GEARING.	REDUCE SPEED BY RETARDING THROTTLE TO LOWER SETTING WITHIN 10 SECONDS AFTER WHISTLE BLOWS.	THROTTLE	OBSERVE SPEED REDUCTION AND ABSENCE OF PENALTY BRAKE APPLICATION.		PROMPT RESPONSE IS REQUIRED TO PREVENT INADVERTENT BRAKE APPLICATION. SAFETY DEVICE TO PREVENT EQUIPMENT DAMAGE AND RUNAWAY TRAINS.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.14	DIFFICULTY	2
TASK TITLE	RESPONDING TO BRAKE WARNING	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	3
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CORRECTION OF "BRAKE WARNING" CONDITION .	BRAKE WARNING LIGHT ILLUMINATES. LOSS OF BRAKING UNDER CERTAIN CONDITIONS (SEE (b) AND (c) POSSIBLE CAUSES).	BRAKE WARNING LIGHT LOAD CURRENT METER, BRAKE WARNING BUZZER.	DETERMINATION OF CAUSE : (a) EXCESSIVE DYNAMIC BRAKING STRENGTH (LOAD CURRENT) (b) DEFECTIVE BRAKE WARNING CIRCUIT (c) REVERSE LEVER IMPROPERLY POSITIONED.	EXCESSIVE BRAKING CURRENT CORRECTED AUTOMATICALLY BY DYNAMIC BRAKE. REGULATOR. IF NOT, MOVE THROTTLE TO REDUCE BRAKING STRENGTH.	THROTTLE	BRAKE WARNING LIGHT GOES OUT. WARNING BUZZER STOPS.		EQUIPMENT DAMAGE MAY RESULT IF BRAKE WARNING LIGHT CONTINUES TO CYCLE ON AND OFF.

ENGINEER TASK ANALYSIS

TASK NO.	F.15	DIFFICULTY	2
TASK TITLE	RESPONDING TO WHEEL SLIP	HAZARD	E
SUB-TASK NO.	—	CRITICALITY	3
SUB-TASK TITLE	—	DURATION	10 SECONDS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CORRECTION OF "WHEEL SLIP" CONDITION.	"WHEEL SLIP" LIGHT ILLUMINATES.	WARNING LIGHT.	DETERMINE IF IT IS NECESSARY TO REDUCE THROTTLE IF AUTOMATIC SANDING DOES NOT PREVENT SEVERE LURCHING.	APPLY SAND TO LEAD TRUCK OR SAND ALL TRUCKS. IF WHEEL SLIP CONTINUES, REDUCE THROTTLE POSITION. IF NONE OF THE ABOVE CAUSES WARNING LIGHT TO EXTINGUISH, TRAIN MUST BE STOPPED AND WHEELS CHECKED.	THROTTLE AND SANDING CONTROLS, IF SANDING IS NOT AUTOMATIC.	WHEEL SLIP LIGHT EXTINGUISHES.		SEVERE DAMAGE TO WHEELS OR GEARING COULD OCCUR IF NOT CORRECTED.
2.	INSPECT FOR SLIDING WHEEL ON LOCOMOTIVE FLAT SPOT ON WHEEL.			UNIT MUST BE SET OUT.	NOTIFY DISPATCHER AND ASSIST ROAD CREW IN SETTING OUT LOCOMOTIVE. ATTACH FORM INDICATING UNIT TROUBLE TO APPROPRIATE LOCATION WITHIN CAB.		CHECK TO SEE IF LOCOMOTIVE CONSIST HAS SLIDING WHEELS. SATISFACTORY CONSIST OPERATION ONCE DEFECTIVE UNIT IS SET OUT.	DISPATCHER, ROAD CREW.	DIL RAILS AND EXERCISE CAUTION TO PREVENT DERAILMENT AS UNIT IS MOVED TO NEAREST SIDING.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.18	DIFFICULTY	3
TASK TITLE	RESPONDING TO OPEN PCS	HAZARD	0
SUB-TASK NO.	-	CRITICALITY	3
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	CORRECTION OF "PCS OPEN" CONDITION.	SPEED AND POWER OF ALL LOCOMOTIVES IN CONSIST REDUCE TO IDLE CONDITION. PCS LIGHT COMES ON.	PCS WARNING LIGHT.	DETERMINATION OF REASON FOR OPENING OF PCS SWITCH: (A) PENALTY BRAKE APPLICATION (SAFETY FOOT PEDAL, OVERSPEED TRIP) (B) EMERGENCY BRAKE APPLICATION.	SET THROTTLE TO IDLE. ELIMINATE CAUSE OF CONDITION. MOVE AUTOMATIC BRAKE HANDLE TO SUPPRESSION POSITION. REMAINING THERE FOR ABOUT 10 SECONDS. PLACE BRAKE HANDLE TO RUNNING POSITION.	THROTTLE. AUTOMATIC BRAKE HANDLE.	PCS LIGHT WILL GO OUT.		FOR OTHER THAN ENGINE-MAN INITIATED EMERGENCY BRAKE APPLICATION, PLACE BRAKE HANDLE IN EMERGENCY POSITION AFTER TRAIN STOPS. THEN PLACE BRAKE HANDLE TO RUNNING POSITION AFTER CAUSE OF APPLICATION HAS BEEN CORRECTED. AFTER THIS, PLACE THROTTLE TO IDLE TO RESET OPEN PCS CONDITION.

ENGINEER TASK ANALYSIS

TASK NO.	F. 17	DIFFICULTY	4
TASK TITLE	RESPONDING TO AUTOMATIC TRAIN CONTROL WARNING	HAZARD	B, C, D, E
SUB-TASK NO.	-	CRITICALITY	4
SUB-TASK TITLE	-	DURATION	1 - 2 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO ATC WARNING SIGNAL.	PENALTY BRAKE WHISTLE SOUNDS.	SPEEDOMETER	SPEED LIMIT FOR BLOCK IS EXCEEDED OR RESTRICTIVE BLOCK IS ENTERED WITHOUT APPROPRIATE ENGINEER ACTION. KNOWLEDGE OF ATC OPERATION IS REQUIRED.	(1) TEMPORARY SUPPRESSION: MAKE SERIES OF SMALL B.P. REDUCTIONS. (2) PERMANENT SUPPRESSION: PLACE AUTOMATIC BRAKE IN SUPPRESSION POSITION.	AUTOMATIC BRAKE VALVE. AUTOMATIC BRAKE VALVE.	PENALTY BRAKE APPLICATION TEMPORARILY SUPPRESSED. PENALTY BRAKE APPLICATION PERMANENTLY SUPPRESSED.		PERMITS MANUAL CONTROL OF TRAIN UNTIL RESTRICTIVE CONDITION CLEARS. BRAKES APPLY WITH FULL SERVICE REDUCTION. THIS IS AN "EASIER" STOP THAN PENALTY BRAKE APPLICATION.

ENGINEMAN TASK ANALYSIS

TASK NO.	F. 18	DIFFICULTY	1
TASK TITLE	RESPONDING TO SAFETY CONTROL DEVICES	HAZARD	0
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	CONTINUOUS DURING MISSION
		FREQUENCY	CONTINUOUS

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	UTILIZE THE ELECTRONIC ALERTNESS CONTROL DEVICE.	IF MOVEMENT OF ENGINEMAN IS NOT DETECTED DURING A 20 SECOND PERIOD, A WHISTLE BLOWS.	WHISTLE.	KNOWLEDGE OF SYSTEM OPERATION.	WITHIN 10 SECONDS. MOVEMENT OF ENGINEMAN IS REQUIRED TO PREVENT A SAFETY BRAKE APPLICATION.		WHISTLE STOPS BLOWING WHEN ENGINEMAN MOVES AND NO BRAKE APPLICATION IS EVIDENCED.		SAFETY FEATURE.
2.	UTILIZE THE PNEUMATIC FOOT VALVE ("DEAD MAN SWITCH").	IF ENGINEMAN FAILS TO KEEP FOOT PEDAL DEPRESSED, A WARNING WHISTLE SOUNDS.	WHISTLE.	KNOWLEDGE OF SYSTEM OPERATION.	WITHIN 4 TO 6 SECONDS AFTER RELEASE OF FOOT PEDAL, A PENALTY BRAKE APPLICATION WILL OCCUR.		IF PEDAL IS DEPRESSED WITHIN THE ALLOTTED TIME DELAY, THE WHISTLE STOPS AND PENALTY BRAKE APPLICATION IS PREVENTED.		SAFETY FEATURE.

ENGINEER TASK ANALYSIS

SHEET 1 OF 2

TASK NO.	F. 19	2
TASK TITLE	RESPONDING TO EMERGENCY BRAKING	
SUB-TASK NO.	-	B, C, D, E
SUB-TASK TITLE	-	5
		2 - 3 MINUTES
		WHEN REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	USE OF EMERGENCY BRAKES.	OBSERVATION OF CONDITIONS REQUIRING QUICK STOP (e.g. VEHICLE ON TRACKS, DAMAGED BRIDGE, ETC.)		DECISION THAT IT IS NECESSARY TO STOP THE TRAIN IN THE SHORTEST POSSIBLE DISTANCE.	MOVE AUTOMATIC BRAKE HANDLE TO EMERGENCY POSITION. MOVE THROTTLE TO IDLE. START SANDING IF NOT EQUIPPED WITH AUTOMATIC SANDING.	AUTOMATIC BRAKE THROTTLE.	EMERGENCY BRAKE APPLICATION WILL RESULT. POWER WILL BE REDUCED AND SANDING WILL RESULT. TRAIN WILL EVENTUALLY STOP.		PREVENT WHEELS FROM SLIDING.
2.	REACTION TO EMERGENCY BRAKE APPLICATION INITIATED FROM OTHER THAN CONTROLLING CAB (e.g. CABOOSE, TRAIN BREAK-IN-TWO, ETC.)	TRAIN SPEED BEGINS TO DECREASE. BRAKE PIPE PRESSURE DECREASES. AUTOMATIC SANDING INITIATED. BRAKE FLOW METER DEFLECTS.	PRESSURE GAUGES.	RECOGNIZE DIFFERENT THAN NORMAL TRAIN OPERATION.	MOVE THROTTLE CLOSED. BAIL LOCOMOTIVE BRAKES. IF WHEELS SLIDE. PLACE AUTOMATIC BRAKE HANDLE IN "EMERGENCY" POSITION.	THROTTLE, AUTOMATIC BRAKE HANDLE.	TRAIN WILL EVENTUALLY STOP.		

ENGINEMAN TASK ANALYSIS

SHEET 2 OF 2

TASK NO.	F. 19	2
TASK TITLE	RESPONDING TO EMERGENCY BRAKING	B. C. O. E
SUB-TASK NO.	-	5
SUB-TASK TITLE	-	2 TO 3 MINUTES
		WHEN REQUIRED

DIFFICULTY
HAZARD
CRITICALITY
DURATION
FREQUENCY

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
3.	RECOVERING FROM EMERGENCY BRAKE CONDITION.	TRAIN HAS COMPLETELY STOPPED FOLLOWING EMERGENCY BRAKING SITUATION.		DETERMINATION THAT CONDITIONS ARE SAFE FOR CONTINUED MOVEMENT OF TRAIN.	PLACE AUTOMATIC BRAKE HANDLE IN THE RELEASE POSITION. INSPECT ALL LOCOMOTIVE WHEELS FOR FLAT SPOTS.	AUTOMATIC BRAKE HANDLE.	THE PCS SWITCH WILL RESET AND THE 26L BRAKE VALVE WILL PERMIT A RECHARGE.		CHECK FOR STUCK BRAKES. DRAGGING BRAKE RIGGING. BROKEN AIR HOSES OR PIPES.

ENGINEMAN TASK ANALYSIS

TASK NO.	F.20	DIFFICULTY	4
TASK TITLE	CORRECTING DERAIL CONDITION	HAZARD	E
SUB-TASK NO.	-	CRITICALITY	3
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RECOVERY FROM DERAIL CONDITION.	DERAILED CAR OR CARS.		DECISION THAT CONDITION IS CORRECTABLE BY USING ON-BOARD EQUIPMENT (e.g. RERAILING FROGS, WALKIE/TALKIE).	COMMUNICATE WITH DISPATCHER. INSURE PROPER FLAG PROTECTION FOR TRAIN. OPERATE TRAIN PER INSTRUCTIONS OF CONDUCTOR OR OTHER CREWMEN TO GET DERAILED CAR BACK ON THE TRACK.	RADIO TELEPHONE. FLAGS. WALKIE/TALKIE, TRAIN CONTROLS.		DISPATCHER. FLAGMEN. CONDUCTOR OR OTHER CREWMEN.	

ENGINEMAN TASK ANALYSIS

TASK NO.	F.21	DIFFICULTY	3
TASK TITLE	REPLACING BROKEN KNUCKLE	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	3
SUB-TASK TITLE	-	DURATION	45 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	REPLACE BROKEN COUPLER KNUCKLES AND BROKEN BRAKE PIPE HOSES.	TRAIN HAS EXPERIENCED EMERGENCY STOP DUE TO TRAIN BREAK-IN-TWO.		CONDUCTOR AND/OR ENGINEMAN DECIDE THAT THE BROKEN KNUCKLE AND HOSES ARE REPAIRABLE WITH HANDWARE EXISTING ON TRAIN.	FOLLOWING REPLACEMENT OF KNUCKLE AND HOSES, ENGINEMAN WILL TEST COUPLING, FOLLOWING INSTRUCTIONS VIA WALKIE/TALKIE.	WALKIE/TALKIE	COUPLING WITHSTANDS INITIAL TEST DURING MOVEMENT OF TRAIN.	COMMUNICATION WITH GROUND PERSONNEL DURING COUPLING OPERATION.	

ENGINEER TASK ANALYSIS

TASK NO.	F.22	DIFFICULTY	3
TASK TITLE	SETTING OUT DAMAGED CARS	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	DEPENDENT UPON CAR DAMAGED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	SET OUT DAMAGED CAR OR CARS	DAMAGED CAR WITHIN TRAIN CONSIST.		DECISION THAT CAR DAMAGE IS SUFFICIENT TO WARRANT SETTING THEM OUT.	ADVISE DISPATCHER THAT CARS ARE BEING SET OUT AT SPECIFIC LOCATION. OPERATE TRAIN IN COORDINATION WITH CREWMEN TO DETACH CARS AND REMAKE TRAIN.	RADIO TELEPHONE	DISPATCHER	DISPATCHER	CAUTION: MAKE SURE COUPLING IS COMPLETED AND AIR BRAKES RECHARGED FOLLOWING TRAIN REMAKE.
					PROVIDE FLAG PROTECTION FOR TRAIN DURING OPERATIONS.	REFERENCE TASK E.3.1 FOR DESCRIPTION OF DETACHING PORTIONS OF TRAIN.	COMMUNICATION WITH CREWMEN DURING OPERATIONS.	CREWMEN	
								FLAGMEN	

ENGINEMAN TASK ANALYSIS

TASK NO.	F. 23	DIFFICULTY	5
TASK TITLE	RESPONDING TO KNOWN LOCOMOTIVE DEFECTS	HAZARD	B. C. H
SUB-TASK NO.	-	CRITICALITY	4
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	WHEN DEFECTS ARE DISCOVERED DURING PRE-AND-POST-RUN INSPECTIONS, TRY TO IDENTIFY THE CAUSE AND THE CONSEQUENCE OF THE DEFECT.	OBSERVATIONS DURING INSPECTION OF LOCOMOTIVES.	INSPECTION CHECK LIST DEFINED BY FEDERAL, STATE AND LOCAL CARRIER REGULATIONS.	ENGINEMAN MUST BE ABLE TO IDENTIFY A DEFECT WHEN IT IS OBSERVED OR DESCRIBED BY GROUND PERSONNEL.	PERFORM ROUTINE INSPECTION SEQUENCE AND/OR EXAMINE LOCOMOTIVE INSPECTION FORM.	LOCOMOTIVE INSPECTION FORM.	VISUAL OBSERVATION DURING INSPECTION, OR AN UNUSUAL SOUND, MOTION OR RESPONSE DURING THE RUN.		LOOK ESPECIALLY FOR LEAKS AND SMOKE.
2.	DETERMINE WHETHER OBSERVED DEFECTS OR MALFUNCTIONS MAY BE OVERLOOKED, CORRECTED IMMEDIATELY OR REPORTED TO MAINTENANCE PERSONNEL FOR REPAIR.	OBSERVED DEFECTS.		DETERMINATION AS TO WHICH DEFECTS CAN BE OVERLOOKED OR OPERATED AROUND TO COMPLETE THE RUN. DETERMINATION OF WHICH DEFECTS CAN BE CORRECTED IMMEDIATELY AND THOSE WHICH REQUIRE ATTENTION BEFORE RUN CAN BE CONTINUED.	CORRECT THOSE DEFECTS WHICH AFFECT SAFE OPERATION. NOTIFY TERMINAL PERSONNEL OF DEFECTS WHICH TRAINMEN CAN NOT FIX THEMSELVES.		RECEIVE CLEARANCE TO MOVE OR STAY PUT UNTIL HELP ARRIVES OR RECEIVE INSTRUCTIONS AS TO TEMPORARY METHODS TO USE SO THAT TRAIN CAN BE MOVED.	INTERACTION WITH: DISPATCHER CENTRALIZED CONTROL PERSONNEL. MAINTENANCE PERSONNEL.	MOVEMENT OF TRAIN WITHOUT PROPER ACTION TO CORRECT DEFECTS COULD RESULT IN PERSONNEL INJURY OR DAMAGE TO EQUIPMENT.
3.	OBSERVE SPECIAL PRECAUTIONS WHEN CONTINUING WITH A LOCOMOTIVE WITH KNOWN DEFECTS OR MALFUNCTIONS.	A DEFECT OR MALFUNCTION IS KNOWN TO EXIST.		ENGINEMAN MUST ISOLATE DEFECTIVE UNIT. REALIZATION THAT LOCOMOTIVE CONSIST NOW OPERATES WITH LESS TOTAL POWER THAN BEFORE.	CONTINUE TO OPERATE TRAIN EXCEPT NOTING THAT ONE OR MORE UNITS HAVE BEEN ISOLATED.	ISOLATE SWITCH TO "ISOLATE".			IF DEFECTIVE UNIT IS NOT ISOLATED, SEVERE DAMAGE MAY RESULT.

ENGINEMAN TASK ANALYSIS

TASK NO.	F. 24	DIFFICULTY	3
TASK TITLE	RESPONDING TO NATURAL HAZARDS	HAZARD	F, G
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	DEAL WITH NATURAL HAZARDS SUCH AS STRONG WINDS, RAIN OR FLOODING WHICH POSE PROBLEMS FOR TRAIN OPERATIONS.	WEATHER CONDITIONS (e.g. RAIN, SNOW, WINDS) AND RESULTING EFFECTS (e.g. FLOODING, MUD SLIDES).		DETERMINATION AS TO WHETHER TO SLOW DOWN, OR MAKE COMPLETE STOP. IF TRACK IS FLOODED, A MEASUREMENT OF DEPTH MUST BE MADE. PROCEED ONLY IF WATER IS LESS THAN 3 INCHES ABOVE RAIL.	OBTAIN INFORMATION FROM DISPATCHER OR OTHER AUTHORITY. REQUEST CREWMAN TO MEASURE THE DEPTH OF THE FLOODED TRACK.	RADIO TELEPHONE RULER OR SCALE.	RECEIVED INSTRUCTIONS FROM AUTHORIZED PERSONNEL. RECEIVE REPORT AS TO DEPTH OF FLOODING.	DISPATCHER, ETC. CREWMAN.	DECISION TO CONTINUE IN ADVERSE WEATHER IS BASED ON ENGINEMAN'S JUDGEMENT AND EXPERIENCE, PLUS INSTRUCTIONS FROM AUTHORIZED PERSONNEL.

ENGINEMAN TASK ANALYSIS

TASK NO.	F. 25	DIFFICULTY	3
TASK TITLE	RESPONDING TO HOT JOURNAL BEARINGS	HAZARD	H
SUB-TASK NO.	-	CRITICALITY	4
SUB-TASK TITLE	-	DURATION	3 - 5 MINUTES
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	RESPONSE TO "HOT BOX" (HOT JOURNAL BEARINGS) ON LOCOMOTIVES.	HOT BOX DETECTOR. DOORS, VISUAL INDICATION.	HOT BOX DETECTOR. DOOR TYPE HEAT INDICATOR.	WHEN INDICATION OF HOT BOX OCCURS, DECISION IS MADE TO CHECK TEMPERATURE OF JOURNAL BOXES.	STOP TRAIN AND THEN CHECK JOURNAL BOXES USING TEMPILSTIK.	TRAIN CONTROLS. TEMPILSTIK	IF TEMPILSTIK MELTS, UNIT MUST BE SET OUT.	COMMUNICATION WITH CREW MEMBERS TO DISCOVER AND THEN CHECK HOT BOXES.	PERIODIC CHECK OF JOURNAL BEARINGS IS RECOMMENDED SINCE HOT BOXES ARE MORE DIFFICULT TO DISCOVER WHILE RUNNING.
2.	RESPONSE TO "HOT BOX" ON CARS.	HOT BOX DETECTOR.			STOP TRAIN AND PERMIT CREW TO LOCATE HOT BOX.	TRAIN CONTROLS. COMMUNICATION DEVICES.		COMMUNICATE WITH CREW TO DETERMINE LOCATION OF HOT BOX.	IF REQUIRED, SET OUT CAR WHICH CONTAINS HOT BOX.

ENGINEMAN TASK ANALYSIS

TASK NO.	G. 1	DIFFICULTY	1
TASK TITLE	OPERATION OF AIR HORN	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED (FREQUENT)

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OPERATION OF AIR HORN AS COMMUNICATION AND WARNING DEVICE PER OPERATING RULES.	<p>CONDITIONS EXIST REQUIRING COMMUNICATION OR WARNING BY WHISTLE.</p> <p>EXAMPLES ARE:</p> <p>(A) WORKMEN NEAR TRACK</p> <p>(B) CROSSING</p> <p>(C) COMMUNICATE WITH CREW MEMBERS.</p>		THOROUGH UNDERSTANDING OF RULES AND DECISION THAT WARNING IS REQUIRED.	PLACE HAND ON CONTROL AND PULL BACK.	AIR HORN CONTROL LEVER.	SOUND OF AIR HORN IS HEARD.	SIGNAL FOR FLAGMAN AND OR CREW MEMBERS.	<p>AIR HORN USAGE IS REQUIRED TO AVOID INJURY TO PERSONNEL AND TO AVOID DAMAGE TO EQUIPMENT (WARNING DEVICE).</p>

ENGINEMAN TASK ANALYSIS

TASK NO.	G.2	DIFFICULTY	1
TASK TITLE	OPERATION OF TRAIN BELL	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OPERATION OF TRAIN BELL.	ENGINEMAN OBSERVES APPROACHING YARD. MARKED CROSSING OR OTHER CONDITIONS DESCRIBED IN OPERATING RULES AND REGULATIONS WHICH REQUIRE OPERATION OF TRAIN BELL. (REFERENCE A. A. R. RULE 30).		ENGINEMAN MUST DECIDE THAT CONDITIONS EXIST REQUIRING USE OF TRAIN BELL AS A WARNING DEVICE.	USING HAND, PULL TRAIN BELL CONTROL SWITCH ALL THE WAY OUT.	TRAIN BELL CONTROL SWITCH.	SOUND OF TRAIN BELL IS HEARD.	WARNING SIGNAL FOR PERSONNEL THAT TRAIN IS MOVING.	USE OF TRAIN BELL MAY PREVENT PERSONNEL INJURY AND DAMAGE TO EQUIPMENT.

ENGINEMAN TASK ANALYSIS

TASK NO.	6.3	DIFFICULTY	2
TASK TITLE	OPERATION OF RADIO/TELEPHONE	HAZARD	-
SUB-TASK NO.	--	CRITICALITY	2
SUB-TASK TITLE	--	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OPERATION OF RADIO/TELEPHONE AS A COMMUNICATIONS DEVICE.	NEED TO COMMUNICATE WITH PERSONNEL.	RADIO/TELEPHONE	ENGINEMAN DECIDES THAT HE MUST EITHER PROVIDE INFORMATION OR RECEIVE INFORMATION OR BOTH. KNOWLEDGE OF COMMUNICATION RULES IS ESSENTIAL. PROPER IDENTIFICATION OF COMMUNICATING PARTIES IS IMPORTANT.	PICKUP HANSET, PRESS BUTTON AND SPEAK. VOLUME CONTROL AND CHANNEL SELECTION IS ALSO PROVIDED.	HANSET OF RADIO/TELEPHONE EQUIPMENT. VOLUME CONTROL, CHANNEL SELECTOR.	PERSON OR OFFICE ADDRESSED ANSWERS.	CONTACT WITH BRAKEMAN, DISPATCHER OR OTHER CREW MEMBER.	USE OF RADIO/TELEPHONE FOR COMMUNICATION TO PREVENT PERSONNEL INJURIES OR EQUIPMENT DAMAGE MAY BE REQUIRED.

ENGINEMAN TASK ANALYSIS

TASK NO.	6.4	DIFFICULTY	1
TASK TITLE	USE OF WINDSHIELD WIPERS AND/OR DEFOGGER	HAZARD	6
SUB-TASK NO.	—	CRITICALITY	2
SUB-TASK TITLE	—	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1 -	USE OF WINDSHIELD WIPERS, WHEN APPROPRIATE. IF REQUIRED, USE DEFOGGER ALSO.	RAINING OR FOGGY WEATHER.		ENGINEMAN MUST DECIDE THAT WINDSHIELD WIPERS ARE NECESSARY. DEFOGGING EQUIPMENT MAY ALSO BE REQUIRED.	MOVE THE WINDSHIELD WIPER CONTROLS TO THE PROPER POSITION. OPERATE THE DEFOGGING CONTROLS.	WINDSHIELD WIPER CONTROLS.	WIPERS OPERATE. WINDSHIELDS CLEAR OF MOISTURE.	IN CASE OF MOTOR DRIVE FAILURE ON THE WIPERS, THE ENGINEMAN MAY HAVE ANOTHER CREW MEMBER OPERATE THE WIPERS BY HAND.	

ENGINEMAN TASK ANALYSIS

TASK NO.	6.3	DIFFICULTY	2
TASK TITLE	OPERATION OF RADIO/TELEPHONE	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OPERATION OF RADIO/TELEPHONE AS A COMMUNICATIONS DEVICE.	NEED TO COMMUNICATE WITH PERSONNEL.	RADIO/TELEPHONE	ENGINEMAN DECIDES THAT HE MUST EITHER PROVIDE INFORMATION OR RECEIVE INFORMATION OR BOTH. KNOWLEDGE OF COMMUNICATION RULES IS ESSENTIAL. PROPER IDENTIFICATION OF COMMUNICATING PARTIES IS IMPORTANT.	PICKUP HANDSET, PRESS BUTTON AND SPEAK. VOLUME CONTROL AND CHANNEL SELECTION IS ALSO PROVIDED.	HANDSET OF RADIO/TELEPHONE EQUIPMENT. VOLUME CONTROL, CHANNEL SELECTOR.	PERSON OR OFFICE ADDRESSED ANSWERS.	CONTACT WITH BRAKEMAN, DISPATCHER OR OTHER CREW MEMBER.	USE OF RADIO/TELEPHONE FOR COMMUNICATION TO PREVENT PERSONNEL INJURIES OR EQUIPMENT DAMAGE MAY BE REQUIRED.

ENGINEMAN TASK ANALYSIS

TASK NO.	6.4	DIFFICULTY	1
TASK TITLE	USE OF WINDSHIELD WIPERS AND/OR DEFOGGER	HAZARD	6
SUB-TASK NO.	—	CRITICALITY	2
SUB-TASK TITLE	—	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1-	USE OF WINDSHIELD WIPERS, WHEN APPROPRIATE. IF REQUIRED, USE DEFOGGER ALSO.	RAINING OR FOGGY WEATHER.		ENGINEMAN MUST DECIDE THAT WINDSHIELD WIPERS ARE NECESSARY. DEFOGGING EQUIPMENT MAY ALSO BE REQUIRED.	MOVE THE WINDSHIELD WIPER CONTROLS TO THE PROPER POSITION. OPERATE THE DEFOGGING CONTROLS.	WINDSHIELD WIPER CONTROLS. DEFOGGING CONTROLS.	WIPERS OPERATE. WINDSHIELDS CLEAR OF MOISTURE.	IN CASE OF MOTOR DRIVE FAILURE ON THE WIPERS, THE ENGINEMAN MAY HAVE ANOTHER CREW MEMBER OPERATE THE WIPERS BY HAND.	

ENGINEMAN TASK ANALYSIS

TASK NO.	6.5	DIFFICULTY	1
TASK TITLE	USE OF LOCOMOTIVE CAB HEATER	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	USE OF LOCOMOTIVE CAB HEATER.	ENGINEMAN IS COLD.		ENGINEMAN FEELS THAT THE USE OF THE CAB HEATER IS NECESSARY.	VERIFY THAT CAB HEAT SUPPLY VALVE AND RETURN VALVES ARE OPEN; ALSO CONFIRM THAT THE CAB HEAT DRAIN VALVE IS CLOSED.	CAB HEAT VENTILATOR FAN CONTROL SWITCH, CAB HEAT SUPPLY VALVE, RETURN VALVE, AND DRAIN VALVE.	THE HEATER SHOULD SUPPLY WARM AIR.		OPEN CAB HEATER DRAIN VALVE WILL RESULT IN LOSS OF ENGINE COOLING WATER.

ENGINEMAN TASK ANALYSIS

TASK NO.	6.6	DIFFICULTY	1
TASK TITLE	USE OF LIGHT CONTROLS	HAZARD	G
SUB-TASK NO.		CRITICALITY	2
SUB-TASK TITLE		DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	USE OF CAB LIGHTING AND HEADLIGHT CONTROLS.	ENGINEMAN OBSERVES APPROACHING TUNNEL, NIGHT OPERATION, OR LIGHTS REQUIRED ACCORDING TO RULES AND REGULATIONS.		ENGINEMAN MUST DETERMINE PROPER LIGHTS TO ENABLE.	MOVE SWITCHES/CONTROLS TO PROPER POSITION.	SWITCHES AND CONTROLS FOR: (A) INTERIOR LIGHTS (B) CLASSIFICATION LIGHTS (C) HEADLIGHTS (D) SIGNAL LIGHTS (E) CONTROL STAND LIGHTS	ENGINEMAN CONFIRMS LIGHTS ARE OPERATIONAL.		

ENGINEMAN TASK ANALYSIS

TASK NO.	6.7	DIFFICULTY	1
TASK TITLE	USE OF ATTENDANT CALL BUTTON	HAZARD	-
SUB-TASK NO.	-	CRITICALITY	2
SUB-TASK TITLE	-	DURATION	5 SECONDS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	USE ATTENDANT CALL PUSHBUTTON.	ENGINEMAN WANTS TO GET THE ATTENTION OF ANOTHER CREW MEMBER WHEN HE IS IN ONE OF THE TRAILING UNITS.		ENGINEMAN MUST DECIDE TO CALL THE CREW MEMBER SO THAT INSTRUCTIONS MAY BE RELAYED TO HIM.	PRESS THE ATTENDANT CALL PUSHBUTTON.	ATTENDANT CALL PUSHBUTTON.	ALARM BELL IS HEARD TO RING.		AN IMMEDIATE ANSWER MUST OCCUR AS THE SAFETY OF THE TRAIN MAY DEPEND UPON WHAT TASK MUST BE PERFORMED.

ENGINEER TASK ANALYSIS

TASK NO.	6.8	DIFFICULTY	I
TASK TITLE	USE OF FIRE EXTINGUISHER	HAZARD	H
SUB-TASK NO.	---	CRITICALITY	3
SUB-TASK TITLE	---	DURATION	AS REQUIRED
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	OPERATE THE FIRE EXTINGUISHER CONTAINING CO ₂ .	SMOKE AND/OR FIRE. DOOR DETECTED.		DECIDE TO INVESTIGATE SOURCE OF SMOKE OR FIRE.	LOCATE FIRE. ELIMINATE FUEL FEEDING FIRE (i.e., OIL, FUEL, OR ELECTRICAL POWER). PUT OUT FIRE USING EXTINGUISHER.	CONTROL SWITCHES AND VALVES, IF REQUIRED. FIRE EXTINGUISHER.	FIRE GOES OUT.	ALERT CREW MEMBERS TO DANGER.	

ENGINEMAN TASK ANALYSIS

SHEET 1 OF 4

TASK NO.	6.9	DIFFICULTY	5
TASK TITLE	OPERATION OF RMU EQUIPMENT	HAZARD	B. C. E
SUB-TASK NO.	-	CRITICALITY	5
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	CONTINUOUS

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	TURN ON RMU EQUIPMENT (REMOTE UNIT) AND SET TO RESPOND CORRECTLY.	RADIO MESSAGE FROM LEAD UNIT.	RADIO.	ENGINEMAN RESPONDS TO REQUEST.	OPERATE THE FOLLOWING SWITCHES AND CONTROLS: RMU KEY SWITCH - ON, RMU ROTARY SWITCH - ENABLED, AUTOMATIC BRAKE HANDLE-HANDLE OFF, SELECTOR - OFF, REVERSER - NEUTRAL, THROTTLE - IDLE, LEAD/TRAIL VALVE - LEAD, CONTROL AND FUEL PUMP SWITCH - OFF, GENERATOR FIELD SWITCH - OFF, ENGINE RUN SWITCH - ON	INDICATED TRAIN CONTROLS AND SWITCHES.	ENGINE REMAINS AT IDLE UNTIL COMMAND RECEIVED FROM LEAD UNIT.	COMMUNICATION BETWEEN LEAD AND REMOTE UNITS.	NOTE THAT THERE MAY BE AN ENGINEMAN IN BOTH THE LEAD AND REMOTE UNITS.
2.	TURN ON RMU EQUIPMENT (EACH UNIT).	RMU IS REQUIRED DURING RUN.		ENGINEMAN UNDERSTANDS RMU OPERATION.	PLACE KEY IN LOCK, TURN TO ON POSITION. RMU ROTARY SWITCH - ENGAGED, RMU CONTROL SWITCH - MU				

ENGINEERMAN TASK ANALYSIS

SHEET 2 OF 4

TASK NO. 6.9
 TASK TITLE OPERATION OF RMU EQUIPMENT
 SUB-TASK NO. -
 SUB-TASK TITLE -

DIFFICULTY 5
 HAZARD B, C, E
 CRITICALITY 5
 DURATION CONTINUOUS
 FREQUENCY CONTINUOUS

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
3.	CONFIRM COMMUNICATION LINK BETWEEN LEAD AND REMOTE UNITS.			KNOW THAT LINK EXISTS BETWEEN UNITS.	PLACE REVERSER TO NEUTRAL AND THROTTLE TO RUN 2 POSITION.	REVERSER, THROTTLE, RMU CONTROL PANEL.	BOTH LEAD AND REMOTE UNITS EXHIBIT ENGINE ADVANCE TO NEW RPM. LEAD UNIT CONTROL PANEL SHOWS REMOTE IN THROTTLE 2.	CONFIRM BY RADIO CONTACT WITH REMOTE UNIT CREWMAN.	NECESSARY PRIOR TO INITIAL MOVEMENT.
4.	CONFIRM SWITCHING TO OTHER OPERATIONAL MODES (e.g. DYNAMIC BRAKING).			KNOW THAT LINK EXISTS BETWEEN UNITS.	PLACE SELECTOR LEVER TO "B".	SELECTOR LEVER, RMU CONTROL PANELS.	"DYN" LIGHT ILLUMINATES ON RMU PANEL.	CONFIRM BY RADIO CONTACT WITH REMOTE UNIT CREWMAN.	
5.	NORMAL OPERATION OF RMU.	INITIAL CHECKS HAVE INDICATED THAT RMU IS FUNCTIONING PROPERLY.		DECIDE THAT CONDITIONS (e.g. SLACK LOCATION, GRADE) ARE SUCH THAT BOTH UNITS SHOULD OPERATE AT THE SAME POWER SETTING.	PLACE RMU SWITCH TO "MU" POSITION.	RMU SELECTOR SWITCH.	BOTH LEAD AND REMOTE UNIT HAVE THE SAME POWER SETTING.	RADIO CONTACT WITH REMOTE.	CONTINUALLY MONITOR RMU CONTROLS FOR INDICATED LOSS OF RADIO CONTACT WITH REMOTE UNIT CONTROLS.

ENGINEMAN TASK ANALYSIS

SHEET 3 OF 4

TASK NO.	6.9	DIFFICULTY	5
TASK TITLE	OPERATION OF RMU EQUIPMENT	HAZARD	B, C, E
SUB-TASK NO.	---	CRITICALITY	5
SUB-TASK TITLE	---	DURATION	CONTINUOUS
		FREQUENCY	CONTINUOUS

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
6.	OPERATE LEAD AND REMOTE AT DIFFERENT POWER SETTINGS.	GRADE, CURVATURE, TRAIN CONSIST, APPROACHING TUNNEL.		BASED ON INPUT INFORMATION, ENGINEMAN DECIDES THAT FOR PROPER TRAIN HANDLING, THE UNITS SHOULD BE AT DIFFERENT POWER SETTINGS.	MOVE RMU SWITCH FROM "RMU" TO THE DESIRED NUMBER POSITION.	RMU CONTROL PANEL, THROTTLE			REMEMBER THAT AFTER RADIO CONTACT IS LOST (e.g. IN A TUNNEL), THE REMOTE UNIT RETAINS ITS LAST POWER SETTING. A MINIMUM REDUCTION ON LEAD UNIT THEN CAUSES THE REMOTE UNIT TO GO TO IDLE.
7.	MAKE AUTOMATIC BRAKE APPLICATION ON RMU UNITS.			KNOWLEDGE THAT BRAKE OPERATIONS MUST BE PERFORMED USING RMU EQUIPMENT (i.e. RMU BRAKE CONTROL PANEL).	DEPRESS THE AUTOMATIC BRAKE BUTTON AND HOLD UNTIL DESIRED BRAKE REDUCTION IS OBTAINED; THEN RELEASE. DEPRESS THE INDEPENDENT BRAKE RELEASE BUTTON TO BAIL, IF REQUIRED.	RMU BRAKE CONTROL PANEL.	OBSERVE BRAKE REDUCTION AS INDICATED ON THE AIR GAUGES. NOTICE AIR RELEASE SOUNDS.	CONFIRM BRAKE OPERATION BY RADIO CONTACT WITH CREWMAN IN REMOTE UNIT.	AUTOMATIC BRAKE OPERATION IS THE SAME FOR BOTH LEAD AND REMOTE UNIT.

ENGINEMAN TASK ANALYSIS

SHEET 4 OF 4

TASK NO.	G. 9	DIFFICULTY	5
TASK TITLE	OPERATION OF RMU EQUIPMENT	HAZARD	B, C, E
SUB-TASK NO.	-	CRITICALITY	5
SUB-TASK TITLE	-	DURATION	CONTINUOUS
		FREQUENCY	CONTINUOUS

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
B.	MAKE AUTOMATIC BRAKE RELEASE ON RMU UNITS.			KNOWLEDGE THAT BRAKE OPERATIONS MUST BE PERFORMED USING RMU EQUIPMENT (i.e. RMU BRAKE CONTROL PANEL).	DEPRESS AUTOMATIC BRAKE "RELEASE" BUTTON.	RMU BRAKE CONTROL PANEL.	AIR GAUGES INDICATE RECHARGING ACTION. SOUND OF AIR FLOWING INTO BRAKE PIPE IS HEARD.	CONFIRM BRAKE OPERATION BY RADIO CONTACT WITH CREWMAN IN REMOTE UNIT.	
9.	INDEPENDENT BRAKE APPLICATION AND RELEASE ON RMU EQUIPPED LOCOMOTIVES.	SLACK ACTION CONTROL IS DESIRED OR DYNAMIC IS BECOMING IN-EFFECTIVE AND LOCOMOTIVE BRAKING WITH INDEPENDENT IS REQUIRED.		CONDITIONS (i.e. MOVEMENT OF LOCOMOTIVES WITH RESPECT TO TRAIN) ARE SUCH THAT LOCOMOTIVE BRAKING IS THE DESIRED BRAKING MODE.	APPLICATION: PRESS INDEPENDENT APPLICATION BUTTON AND HOLD UNTIL DESIRED APPLICATION IS OBTAINED. RELEASE: MOMENTARILY PRESS THE INDEPENDENT RELEASE BUTTON.	RMU BRAKE CONTROL PANEL.	B.C. PRESSURE GAUGE INCREASES. B.C. PRESSURE GAUGE DECREASES TO ZERO. SHARP RELEASE AIR SOUND IS HEARD.		IMPROPER USE OF INDEPENDENT COULD RESULT IN SEVERE SLACK ACTION.

ENGINEMAN TASK ANALYSIS

TASK NO.	6.10	DIFFICULTY	1
TASK TITLE	USE OF RETAINERS	HAZARD	B. E
SUB-TASK NO.	-	CRITICALITY	3
SUB-TASK TITLE	-	DURATION	DEPENDENT UPON NUMBER OF RETAINERS
		FREQUENCY	AS REQUIRED

STEP NO.	DESCRIPTION	INPUT (STIMULUS)		INFO PROCESSING OR DECISION MAKING	OUTPUT (RESPONSE)		FEEDBACK (RESULTS)	CREW INTERACTION	COMMENTS
		INFORMATION	DISPLAY OR COMM EQUIPMENT		ACTION	CONTROL OR COMM EQUIPMENT			
1.	ORDER RETAINERS SET ON THE REQUIRED NUMBER OF CARS.	TRAIN READY TO MOVE. ENGINEMAN'S KNOWLEDGE OF GRADE AND SLACK CONDITIONS.		DECISION MAY INDICATE THAT SOME RETAINERS SHOULD BE SET TO PROVIDE ADDITIONAL RETARDATION OF THE TRAIN AFTER BRAKES ARE RELEASED AND CAR EQUIPMENT IS BEING RECHARGED.	GIVE ORDERS TO SET RETAINERS.	RADIO/TELEPHONE, WALKIE/TALKIE, HAND SIGNAL OR VERBAL COMMAND.		COMMUNICATE WITH CREW MEMBER OR YARD PERSONNEL.	IF RETAINERS ARE NOT SET, SPEED MAY INCREASE TOO RAPIDLY. RETAINERS ARE UTILIZED FOR CERTAIN EXTREME GRADE BRAKING SITUATIONS.

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